APPENDIX B

COST ESTIMATING WORKSHEETS USED TO ESTIMATE THE COSTS OF CLOSURE OF CONTAINER STORAGE AREAS (CSA)

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A CSA CAPACITY 500 GALLONS

Facility Name: CSA 500 Gallons

SUMMARY WORKSHEET

	Activity **Some of the activities listed below are conducted routinely as part of closure. The owner or operator, however, might intend or be required to conduct certain additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type.**	Worksheet Number	Cost ($)
1.	Removal of Waste	CS-3	
2.	*Demolition and Removal of Containment System*	CS-4	
3.	*Removal of Soil*	CS-5	
4.	*Backfill*	CS-6	
5.	Decontamination	CS-7	$113
6.	Sampling and Analysis	CS-8	$2,491
7.	Transportation	CS-9	$1,088
8.	Treatment and Disposal	CS-10	$818
9.	**Subtotal of Closure Costs (Add lines 1 through 8)**		**$4,510**
10.	Engineering Expenses (approximately 10% of closure costs, excluding certification of closure) (Multiply line 9 by 0.10)		$451
11.	Certification of Closure	CS-11	$3,640
12.	**Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 9, 10, and 11)**		**$8,601**
13.	Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 12 by 0.20)		$1,720
	TOTAL COST OF CLOSURE (Add lines 12 and 13)		**$10,321**

CONTAINER STORAGE AREAS CS-2

The information entered on this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the costs of closure for container storage areas. If the design characteristics of the container storage area to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures and materials to be removed.[a] Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete each section of this inventory worksheet.

1 MAXIMUM PERMITTED CAPACITY

Determine the maximum permitted capacity of the container storage area to determine the cost of waste disposal.

1.A	**Volume of Waste**	**500**	**gal**

2 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure. Calculate the surface area of the secondary containment system pad to determine the costs of decontaminating and demolishing the pad.

2.A	Length (excluding any curbs or berm)	ft	
2.B	Width (excluding any curbs or berm)	ft	
2.C	**Surface Area of Containment System Pad (Multiply line 2.A by line 2.B)**	**72.4**	**ft^2**
2.D	**Surface Area of Containment System Pad in yd^2 (Divide line 2.C by 9)**	**8.0**	**yd^2**

3 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure. Calculate the volume of the secondary containment system pad to determine the cost of removal.

3.A	Thickness	ft	
3.B	Thickness in yards (Divide line 3.A by 3)	yd	
3.C	**Volume of Containment System Pad (Multiply line 2.D by line 3.B)**		**yd^3**

DECONTAMINATION SUMMARY WORKSHEET - Page 1 of 1

Facility Name: CSA 500 Gallons

DECONTAMINATION SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	CS-7A	$75
2.	Decontamination of Unit by Sandblasting	CS-7B	$
3.	Decontamination of Heavy Equipment	CS-7C	$38
TOTAL COST OF DECONTAMINATION (Add lines 1, 2, and 3) (Enter total on Worksheet CS-1, line 5)			**$113**

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 1 of 2

1	Area of unit to be decontaminated (Enter from Worksheet CS-2; add lines 2.C, 4.C, and 6.A)	72.4 ft^2	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to steam clean or pressure wash one ft^2[c]	work hrs/ft^2	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	2.0 work hrs	
6	Subtotal of labor and equipment costs to decontaminate the unit by steam cleaning or pressure washing (Multiply line 3 by line 5)		$75
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft^2)[d] (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	290 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)		$0
TOTAL COST OF DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING (For bulk liquids, enter from line 6. For liquids in drums, add lines 6 and 10.) (Enter total on Worksheet CS-7, line 1)			**$75**

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.

[c] Enter the estimated number of work hours required to steam clean or pressure wash one ft^2 of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft^2 of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] U.S. Environmental Protection Agency, *Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H)*, November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative rates may be used, as appropriate.

DECONTAMINATION OF HEAVY EQUIPMENT - Page 1 of 2

1	Number of hours needed to decontaminate all heavy equipment used during closure of the unit (Enter from Page 3 of 3 of this worksheet)	1 work hrs	
2	Cost of rental of steam cleaner per hour	$ /hr	
3	Subtotal steam cleaner rental costs (Multiply line 1 by line 2)		$6
4	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
5	Labor cost per work hour[b]	$	
6	Subtotal of labor costs (Multiply line 1 by line 5)		$32
7	Volume of decontamination fluid (Multiply line 1 by 100 gallons per hour) (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation, treatment, and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	100 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum and round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums (Multiply line 8 by line 9)		$0
11	Cost of construction of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**		$0

12	Cost of demolition of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**	$0
TOTAL COST OF DECONTAMINATION OF HEAVY EQUIPMENT (Add lines 3, 6, 10, 11, and 12) (Enter total on worksheet CS-7, line 3)		**$38**

Remember to calculate costs for transporting, treating, and disposing of all wastes in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor required to decontaminate heavy equipment.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: CSA 500 Gallons

SAMPLING AND ANALYSIS SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Drilling and Subsurface Soil Sampling & Analysis	CS-8B	$0
2.	Concrete Core Sampling & Analysis	CS-8C	$458
3.	Wipe Sampling & Analysis	CS-8D	$508
4.	Surface Water/Liquid Sampling & Analysis	CS-8E	$1,017
5.	Soil/Sludge/Sediment Sampling & Analysis	CS-8F	$508
TOTAL SAMPLING AND ANALYSIS COST (Add lines 1 through 5) (Enter total on Worksheet CS-1, line 6)			**$2,491**

The information entered on this inventory worksheet will be used in completing the appropriate cost estimating worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES

In the space below, identify the number of boreholes and the number of subsurface soil samples per borehole to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

1	**Number of Subsurface Soil Samples** **Boring Diameter:**				
		boreholes	**samples/borehole**	0	**total samples**

2 NUMBER OF CONCRETE CORE SAMPLES

In the space below, identify the number of concrete core samples to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

2	**Number of Concrete Core Samples**	1	**total samples**

3 NUMBER OF WIPE SAMPLES

In the space below, identify the number of sample locations and the number of wipe samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

3	**Number of Wipe Samples**				
		locations	**samples/location**	1	**total samples**

4 NUMBER OF SURFACE WATER/LIQUID SAMPLES

In the space below, identify the number of grab samples on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.

4	**Number of Aqueous Samples**				
		locations	**samples/location**	2	**total samples**

5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES

In the space below, identify the number of grab samples of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

5	**Number of Nonaqueous Samples**				
		locations	**samples/location**	1	**total samples**

Coring may be necessary to collect samples from hard surfaces, such as concrete.

1	**COLLECTING CONCRETE CORE SAMPLES**		
1.A	Number of concrete core samples to be collected (Enter from worksheet CS-8A, line 2)	1 core samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate to drill a 3-inch-diameter core sample boring to a depth of 6 inches[c]	work hr/sample	
1.E	Number of hours required to drill 3-inch-diameter borings (Multiply line 1.A by Line 1.D) (One hour minimum; round up to the half-hour)	1.0 work hrs	
1.F	**Cost to Collect Concrete Core Samples (Multiply line 1.C by line 1.E)**		**$41**
2	**ANALYZING CONCRETE CORE SAMPLES**		
2.A	Determine the cost of analysis per sampling event for concrete core samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Enter the number of sampling events	3 events	
2.C	**Cost to Analyze Concrete Core Samples (Multiply line 2.A by line 2.B)**		**$417**
	TOTAL COST OF COLLECTION AND ANALYSIS OF CONCRETE CORE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 2)		**$458**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect concrete core samples.

[c] Enter the estimated number of work hours required to drill one 3-inch-diameter core sample boring to a depth of 6 inches. If, for example, it is estimated that it will take 45 minutes to drill one 3-inch-diameter core sample boring, enter a work rate of 0.750 (45 divided by 60) for conducting that activity. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all its sampling equipment. If an estimate of the total number of hours required to drill 3-inch-diameter core sample borings has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1	**COLLECTING WIPE SAMPLES**		
1.A	Number of wipe samples to be collected (Enter from worksheet CS-8A, line 3)	1 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.0 work hrs	
1.F	**Cost to Collect Wipe Samples (Multiply line 1.C by line 1.E)**		**$91**
2	**ANALYZING WIPE SAMPLES**		
2.A	Cost of analysis per sampling event for wipe samples (Enter from page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	3 events	
2.C	**Cost to Analyze Wipe Samples (Multiply line 2.A by line 2.B)**		**$417**
	TOTAL COST OF COLLECTION AND ANALYSIS OF WIPE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 3)		**$508**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.

[c] Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Surface water/liquid samples are grab samples taken on lakes, rivers, or ponds or samples of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLLECTING SURFACE WATER/LIQUID SAMPLES			
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet CS-8A, line 4)	2 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]		
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	2.0 work hrs	
1.F	**Cost to Collect Surface Water/Liquid Samples (Multiply line 1.C by line 1.E)**		**$183**
2 ANALYZING SURFACE WATER/LIQUID SAMPLES			
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	6 events	
2.C	**Cost to Analyze Surface Water/Liquid Samples (Multiply line 2.A by line 2.B)**		**$834**
	TOTAL COST OF COLLECTION AND ANALYSIS OF AQUEOUS SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 4)		**$1,017**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect aqueous samples.

[c] Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly

on line 1.E.

Soil/sludge/sediment samples are grab samples of surface soil, sludge, sediment, or concrete chips. Such samples are shallow samples, that is, they are typically collected at depths of less than 1.5 feet below the ground surface.

1	**COLLECTING SOIL/SLUDGE/SEDIMENT SAMPLES**		
1.A	Number of soil/sludge/sediment samples to be collected (Enter from worksheet CS-8A, line 5)	1 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.0 work hrs	
1.F	**Cost to Collect Soil/Sludge/Sediment Samples (Multiply line 1.C by line 1.E)**		**$91**
2	**ANALYZING SOIL/SLUDGE/SEDIMENT SAMPLES**		
2.A	Cost of analysis per sampling event for soil/sludge/sediment samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	3 events	
2.C	**Cost to Analyze Soil/Sludge/Sediment Samples (Multiply line 2.A by line 2.B)**		**$417**
	TOTAL COST OF COLLECTION AND ANALYSIS OF SOIL/SLUDGE/SEDIMENT SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 5)		**$508**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect soil/sludge/sediment samples.

[c] Enter the estimated number of work hours required to collect one soil/sludge/sediment sample. If, for example, it is estimated that it will take 10 minutes per sample to collect soil/sludge/sediment samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect soil/sludge/sediment samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Depending on the activities being conducted, it may not be necessary to complete all sections of this worksheet.

1	**TRANSPORTATION OF WASTE IN DRUMS**		
1.A	Number of drums of waste	10 drums	
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)	1 truckloads	
1.D	**Cost to Transport Waste In Drums (Multiply line 1.B by line 1.C)**		**$1,088**
2	**TRANSPORTATION OF BULK LIQUIDS**		
2.A	Gallons of liquid waste	gal	
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	truckloads	
2.D	**Cost to Transport Bulk Liquid Waste (Multiply line 2.B by line 2.C)**		**$**
3	**TRANSPORTATION OF BULK WASTE**		
3.A	Number of waste debris boxes	debris boxes	
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
3.C	**Cost to Transport Bulk Solid Waste (assume one debris box can be hauled on each truck) (Multiply line 3.A by line 3.B)**		**$**
	TOTAL COST TO TRANSPORT WASTE (Add lines 1.D, 2.D, and 3.C) (Enter total on Worksheet CS-1, line 7)		**$1,088**

TREATMENT AND DISPOSAL SUMMARY SHEET - Page 1 of 1

Facility Name: CSA 500 Gallons

SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost ($)
1.	Treatment and Disposal of Waste	CS-10A	
2.	Transportation and Disposal of Decontamination Fluids	CS-10B	$818
TOTAL COST OF TREATMENT AND DISPOSAL *(Add lines 1 and 2)* *(Enter total on Worksheet CS-1, line 8)*			**$818**

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. _____ gal _____ gal _____ gal _____ gal _____ gal	390 total gal	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon)[c]	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	1 work hours	
6	Subtotal of labor and equipment cost to pump decontamination fluid to a holding tank (multiply line 3 by line 5)		$43
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	$ /day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	1 tanks	
10	Subtotal of tank rental costs (Multiply lines 7, 8, and 9)		$365
11	Removal cost per gallon of bulk liquid[d]	$ /gal	
12	Subtotal of removal cost for bulk liquids (Multiply line 1 by line 11)		$410
TOTAL COST TO TRANSPORT AND DISPOSE OF DECONTAMINATION FLUID AS A BULK LIQUID (Add lines 6, 10, and 12) (Enter total on Worksheet CS-10, line 2)			**$818**

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.

[c] Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

CONTAINER STORAGE AREAS CS-11

CERTIFICATION OF CLOSURE - Page 1 of 1

1	Number of units requiring certification of closure[a]	1	
2	Cost of certification of closure per unit[b]	$	
TOTAL COST OF CERTIFICATION OF CLOSURE (Multiply line 1 by line 2) (Enter total on Worksheet CS-1, line 11)			**$3,640**

Notes:

[a] Facilities closing multiple container storage areas in the same manner at the same time should incur cost of certification of closure only once.

[b] This cost includes the cost of performance of the following activities by a registered professional engineer: 1) reviewing the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A CSA CAPACITY 1,000 GALLONS

Facility Name: CSA 1,000 Gallons

SUMMARY WORKSHEET

	Activity **Some of the activities listed below are conducted routinely as part of closure. The owner or operator, however, might intend or be required to conduct certain additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type.**	Worksheet Number	Cost ($)
1.	Removal of Waste	CS-3	
2.	*Demolition and Removal of Containment System*	CS-4	
3.	*Removal of Soil*	CS-5	
4.	*Backfill*	CS-6	
5.	Decontamination	CS-7	$187
6.	Sampling and Analysis	CS-8	$2,491
7.	Transportation	CS-9	$1,088
8.	Treatment and Disposal	CS-10	$1,121
9.	**Subtotal of Closure Costs (Add lines 1 through 8)**		**$4,887**
10.	Engineering Expenses (approximately 10% of closure costs, excluding certification of closure) (Multiply line 9 by 0.10)		$489
11.	Certification of Closure	CS-11	$3,640
12.	**Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 9, 10, and 11)**		**$9,016**
13.	Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 12 by 0.20)		$1,803
TOTAL COST OF CLOSURE (Add lines 12 and 13)			**$10,819**

CONTAINER STORAGE AREAS CS-2

The information entered on this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the costs of closure for container storage areas. If the design characteristics of the container storage area to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures and materials to be removed.[a] Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete each section of this inventory worksheet.

1 MAXIMUM PERMITTED CAPACITY

Determine the maximum permitted capacity of the container storage area to determine the cost of waste disposal.

1.A	**Volume of Waste**	**1,000**	**gal**

2 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure. Calculate the surface area of the secondary containment system pad to determine the costs of decontaminating and demolishing the pad.

2.A	Length (excluding any curbs or berm)	ft	
2.B	Width (excluding any curbs or berm)	ft	
2.C	**Surface Area of Containment System Pad (Multiply line 2.A by line 2.B)**	**144.8**	**ft^2**
2.D	**Surface Area of Containment System Pad in yd^2 (Divide line 2.C by 9)**	**16.1**	**yd^2**

3 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure. Calculate the volume of the secondary containment system pad to determine the cost of removal.

3.A	Thickness	ft	
3.B	Thickness in yards (Divide line 3.A by 3)	yd	
3.C	**Volume of Containment System Pad (Multiply line 2.D by line 3.B)**		**yd^3**

DECONTAMINATION SUMMARY WORKSHEET - Page 1 of 1

Facility Name: CSA 1,000 Gallons

DECONTAMINATION SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	CS-7A	$149
2.	Decontamination of Unit by Sandblasting	CS-7B	$
3.	Decontamination of Heavy Equipment	CS-7C	$38
TOTAL COST OF DECONTAMINATION (Add lines 1, 2, and 3) (Enter total on Worksheet CS-1, line 5)			**$187**

1	Area of unit to be decontaminated (Enter from Worksheet CS-2; add lines 2.C, 4.C, and 6.A)	144.8 ft^2	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to steam clean or pressure wash one ft^2[c]	work hrs/ft^2	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	4.0 work hrs	
6	Subtotal of labor and equipment costs to decontaminate the unit by steam cleaning or pressure washing (Multiply line 3 by line 5)		$149
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft^2)[d] (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	579 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)		$0
TOTAL COST OF DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING (For bulk liquids, enter from line 6. For liquids in drums, add lines 6 and 10.) (Enter total on Worksheet CS-7, line 1)			**$149**

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.

[c] Enter the estimated number of work hours required to steam clean or pressure wash one ft^2 of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft^2 of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] U.S. Environmental Protection Agency, *Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H)*, November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative rates may be used, as appropriate.

1	Number of hours needed to decontaminate all heavy equipment used during closure of the unit (Enter from Page 3 of 3 of this worksheet)	1 work hrs	
2	Cost of rental of steam cleaner per hour	$ /hr	
3	Subtotal steam cleaner rental costs (Multiply line 1 by line 2)		$6
4	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
5	Labor cost per work hour[b]	$	
6	Subtotal of labor costs (Multiply line 1 by line 5)		$32
7	Volume of decontamination fluid (Multiply line 1 by 100 gallons per hour) (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation, treatment, and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	100 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum and round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums (Multiply line 8 by line 9)		$0
11	Cost of construction of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**		$0

12	Cost of demolition of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**	$0
TOTAL COST OF DECONTAMINATION OF HEAVY EQUIPMENT (Add lines 3, 6, 10, 11, and 12) (Enter total on worksheet CS-7, line 3)		**$38**

Remember to calculate costs for transporting, treating, and disposing of all wastes in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor required to decontaminate heavy equipment.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: CSA 1,000 Gallons

SAMPLING AND ANALYSIS SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Drilling and Subsurface Soil Sampling & Analysis	CS-8B	$0
2.	Concrete Core Sampling & Analysis	CS-8C	$458
3.	Wipe Sampling & Analysis	CS-8D	$508
4.	Surface Water/Liquid Sampling & Analysis	CS-8E	$1,017
5.	Soil/Sludge/Sediment Sampling & Analysis	CS-8F	$508
TOTAL SAMPLING AND ANALYSIS COST (Add lines 1 through 5) (Enter total on Worksheet CS-1, line 6)			**$2,491**

The information entered on this inventory worksheet will be used in completing the appropriate cost estimating worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES

In the space below, identify the number of boreholes and the number of subsurface soil samples per borehole to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

1	**Number of Subsurface Soil Samples** **Boring Diameter:**	**boreholes**	**samples/borehole**	0	**total samples**

2 NUMBER OF CONCRETE CORE SAMPLES

In the space below, identify the number of concrete core samples to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

2	**Number of Concrete Core Samples**	1	**total samples**

3 NUMBER OF WIPE SAMPLES

In the space below, identify the number of sample locations and the number of wipe samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

3	**Number of Wipe Samples**	**locations**	**samples/location**	1	**total samples**

4 NUMBER OF SURFACE WATER/LIQUID SAMPLES

In the space below, identify the number of grab samples on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.

4	**Number of Aqueous Samples**	**locations**	**samples/location**	2	**total samples**

5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES

In the space below, identify the number of grab samples of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

5	**Number of Nonaqueous Samples**			
		locations	**samples/location**	1 **total samples**

Coring may be necessary to collect samples from hard surfaces, such as concrete.

1	**COLLECTING CONCRETE CORE SAMPLES**		
1.A	Number of concrete core samples to be collected (Enter from worksheet CS-8A, line 2)	1 core samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate to drill a 3-inch-diameter core sample boring to a depth of 6 inches[c]	work hr/sample	
1.E	Number of hours required to drill 3-inch-diameter borings (Multiply line 1.A by Line 1.D) (One hour minimum; round up to the half-hour)	1.0 work hrs	
1.F	**Cost to Collect Concrete Core Samples (Multiply line 1.C by line 1.E)**		**$41**
2	**ANALYZING CONCRETE CORE SAMPLES**		
2.A	Determine the cost of analysis per sampling event for concrete core samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Enter the number of sampling events	3 events	
2.C	**Cost to Analyze Concrete Core Samples (Multiply line 2.A by line 2.B)**		**$417**
	TOTAL COST OF COLLECTION AND ANALYSIS OF CONCRETE CORE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 2)		**$458**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect concrete core samples.

[c] Enter the estimated number of work hours required to drill one 3-inch-diameter core sample boring to a depth of 6 inches. If, for example, it is estimated that it will take 45 minutes to drill one 3-inch-diameter core sample boring, enter a work rate of 0.750 (45 divided by 60) for conducting that activity. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all its sampling equipment. If an estimate of the total number of hours required to drill 3-inch-diameter core sample borings has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1	**COLLECTING WIPE SAMPLES**		
1.A	Number of wipe samples to be collected (Enter from worksheet CS-8A, line 3)	1 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.0 work hrs	
1.F	**Cost to Collect Wipe Samples (Multiply line 1.C by line 1.E)**		**$91**
2	**ANALYZING WIPE SAMPLES**		
2.A	Cost of analysis per sampling event for wipe samples (Enter from page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	3 events	
2.C	**Cost to Analyze Wipe Samples (Multiply line 2.A by line 2.B)**		**$417**
	TOTAL COST OF COLLECTION AND ANALYSIS OF WIPE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 3)		**$508**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.

[c] Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Surface water/liquid samples are grab samples taken on lakes, rivers, or ponds or samples of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLLECTING SURFACE WATER/LIQUID SAMPLES			
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet CS-8A, line 4)	2 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]		
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	2.0 work hrs	
1.F	**Cost to Collect Surface Water/Liquid Samples (Multiply line 1.C by line 1.E)**		**$183**
2 ANALYZING SURFACE WATER/LIQUID SAMPLES			
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	6 events	
2.C	**Cost to Analyze Surface Water/Liquid Samples (Multiply line 2.A by line 2.B)**		**$834**
	TOTAL COST OF COLLECTION AND ANALYSIS OF AQUEOUS SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 4)		**$1,017**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect aqueous samples.

[c] Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Soil/sludge/sediment samples are grab samples of surface soil, sludge, sediment, or concrete chips. Such samples are shallow samples, that is, they are typically collected at depths of less than 1.5 feet below the ground surface.

1	**COLLECTING SOIL/SLUDGE/SEDIMENT SAMPLES**		
1.A	Number of soil/sludge/sediment samples to be collected (Enter from worksheet CS-8A, line 5)	1 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.0 work hrs	
1.F	**Cost to Collect Soil/Sludge/Sediment Samples (Multiply line 1.C by line 1.E)**		**$91**
2	**ANALYZING SOIL/SLUDGE/SEDIMENT SAMPLES**		
2.A	Cost of analysis per sampling event for soil/sludge/sediment samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	3 events	
2.C	**Cost to Analyze Soil/Sludge/Sediment Samples (Multiply line 2.A by line 2.B)**		**$417**
	TOTAL COST OF COLLECTION AND ANALYSIS OF SOIL/SLUDGE/SEDIMENT SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 5)		**$508**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect soil/sludge/sediment samples.

[c] Enter the estimated number of work hours required to collect one soil/sludge/sediment sample. If, for example, it is estimated that it will take 10 minutes per sample to collect soil/sludge/sediment samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect soil/sludge/sediment samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Facility Name: CSA 1,000 Gallons

Depending on the activities being conducted, it may not be necessary to complete all sections of this worksheet.

1	**TRANSPORTATION OF WASTE IN DRUMS**		
1.A	Number of drums of waste	19 drums	
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)	1 truckloads	
1.D	**Cost to Transport Waste In Drums (Multiply line 1.B by line 1.C)**		**$1,088**
2	**TRANSPORTATION OF BULK LIQUIDS**		
2.A	Gallons of liquid waste	gal	
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	truckloads	
2.D	**Cost to Transport Bulk Liquid Waste (Multiply line 2.B by line 2.C)**		**$**
3	**TRANSPORTATION OF BULK WASTE**		
3.A	Number of waste debris boxes	debris boxes	
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
3.C	**Cost to Transport Bulk Solid Waste (assume one debris box can be hauled on each truck) (Multiply line 3.A by line 3.B)**		**$**
	TOTAL COST TO TRANSPORT WASTE (Add lines 1.D, 2.D, and 3.C) (Enter total on Worksheet CS-1, line 7)		**$1,088**

Facility Name: CSA 1,000 Gallons

SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost ($)
1.	Treatment and Disposal of Waste	CS-10A	
2.	Transportation and Disposal of Decontamination Fluids	CS-10B	$1,121
TOTAL COST OF TREATMENT AND DISPOSAL *(Add lines 1 and 2)* *(Enter total on Worksheet CS-1, line 8)*			**$1,121**

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. _____ gal _____ gal _____ gal _____ gal _____ gal	679 total gal	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon)[c]	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	1 work hours	
6	Subtotal of labor and equipment cost to pump decontamination fluid to a holding tank (multiply line 3 by line 5)		$43
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	$ /day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	1 tanks	
10	Subtotal of tank rental costs (Multiply lines 7, 8, and 9)		$365
11	Removal cost per gallon of bulk liquid[d]	$ /gal	
12	Subtotal of removal cost for bulk liquids (Multiply line 1 by line 11)		$713
TOTAL COST TO TRANSPORT AND DISPOSE OF DECONTAMINATION FLUID AS A BULK LIQUID (Add lines 6, 10, and 12) (Enter total on Worksheet CS-10, line 2)			**$1,121**

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.

[c] Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

CONTAINER STORAGE AREAS CS-11

CERTIFICATION OF CLOSURE - Page 1 of 1

1	Number of units requiring certification of closure[a]	1	
2	Cost of certification of closure per unit[b]	$	
TOTAL COST OF CERTIFICATION OF CLOSURE (Multiply line 1 by line 2) (Enter total on Worksheet CS-1, line 11)			**$3,640**

Notes:

[a] Facilities closing multiple container storage areas in the same manner at the same time should incur cost of certification of closure only once.

[b] This cost includes the cost of performance of the following activities by a registered professional engineer: 1) reviewing the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A CSA CAPACITY 5,000 GALLONS

Facility Name: CSA 5,000 Gallons

SUMMARY WORKSHEET

	Activity **Some of the activities listed below are conducted routinely as part of closure. The owner or operator, however, might intend or be required to conduct certain additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type.**	Worksheet Number	Cost ($)
1.	Removal of Waste	CS-3	
2.	*Demolition and Removal of Containment System*	CS-4	
3.	*Removal of Soil*	CS-5	
4.	*Backfill*	CS-6	
5.	Decontamination	CS-7	$784
6.	Sampling and Analysis	CS-8	$2,491
7.	Transportation	CS-9	$2,175
8.	Treatment and Disposal	CS-10	$3,554
9.	**Subtotal of Closure Costs (Add lines 1 through 8)**		**$9,004**
10.	Engineering Expenses (approximately 10% of closure costs, excluding certification of closure) (Multiply line 9 by 0.10)		$900
11.	Certification of Closure	CS-11	$3,640
12.	**Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 9, 10, and 11)**		**$13,544**
13.	Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 12 by 0.20)		$2,709
TOTAL COST OF CLOSURE (Add lines 12 and 13)			**$16,253**

CONTAINER STORAGE AREAS CS-2

The information entered on this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the costs of closure for container storage areas. If the design characteristics of the container storage area to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures and materials to be removed.[a] Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete each section of this inventory worksheet.

1 MAXIMUM PERMITTED CAPACITY

Determine the maximum permitted capacity of the container storage area to determine the cost of waste disposal.

1.A	**Volume of Waste**	**5,000**	**gal**

2 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure. Calculate the surface area of the secondary containment system pad to determine the costs of decontaminating and demolishing the pad.

2.A	Length (excluding any curbs or berm)	ft	
2.B	Width (excluding any curbs or berm)	ft	
2.C	**Surface Area of Containment System Pad (Multiply line 2.A by line 2.B)**	**723.9**	**ft^2**
2.D	**Surface Area of Containment System Pad in yd^2 (Divide line 2.C by 9)**	**80.4**	**yd^2**

3 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure. Calculate the volume of the secondary containment system pad to determine the cost of removal.

3.A	Thickness	ft	
3.B	Thickness in yards (Divide line 3.A by 3)	yd	
3.C	**Volume of Containment System Pad (Multiply line 2.D by line 3.B)**		**yd^3**

DECONTAMINATION SUMMARY WORKSHEET - Page 1 of 1

Facility Name: CSA 5,000 Gallons

DECONTAMINATION SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	CS-7A	$746
2.	Decontamination of Unit by Sandblasting	CS-7B	$
3.	Decontamination of Heavy Equipment	CS-7C	$38
TOTAL COST OF DECONTAMINATION (Add lines 1, 2, and 3) (Enter total on Worksheet CS-1, line 5)			**$784**

1	Area of unit to be decontaminated (Enter from Worksheet CS-2; add lines 2.C, 4.C, and 6.A)	723.9 ft^2	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to steam clean or pressure wash one ft^2[c]	work hrs/ft^2	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	20.0 work hrs	
6	Subtotal of labor and equipment costs to decontaminate the unit by steam cleaning or pressure washing (Multiply line 3 by line 5)		$746
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft^2)[d] (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	2,896 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)		$0
TOTAL COST OF DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING (For bulk liquids, enter from line 6. For liquids in drums, add lines 6 and 10.) (Enter total on Worksheet CS-7, line 1)			**$746**

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.

[c] Enter the estimated number of work hours required to steam clean or pressure wash one ft^2 of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft^2 of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] U.S. Environmental Protection Agency, *Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H)*, November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative rates may be used, as appropriate.

1	Number of hours needed to decontaminate all heavy equipment used during closure of the unit (Enter from Page 3 of 3 of this worksheet)	1 work hrs	
2	Cost of rental of steam cleaner per hour	$ /hr	
3	Subtotal steam cleaner rental costs (Multiply line 1 by line 2)		$6
4	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
5	Labor cost per work hour[b]	$	
6	Subtotal of labor costs (Multiply line 1 by line 5)		$32
7	Volume of decontamination fluid (Multiply line 1 by 100 gallons per hour) (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation, treatment, and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	100 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum and round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums (Multiply line 8 by line 9)		$0
11	Cost of construction of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**		$0

12	Cost of demolition of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**	$0
TOTAL COST OF DECONTAMINATION OF HEAVY EQUIPMENT (Add lines 3, 6, 10, 11, and 12) (Enter total on worksheet CS-7, line 3)		**$38**

Remember to calculate costs for transporting, treating, and disposing of all wastes in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor required to decontaminate heavy equipment.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: CSA 5,000 Gallons

SAMPLING AND ANALYSIS SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Drilling and Subsurface Soil Sampling & Analysis	CS-8B	$0
2.	Concrete Core Sampling & Analysis	CS-8C	$458
3.	Wipe Sampling & Analysis	CS-8D	$508
4.	Surface Water/Liquid Sampling & Analysis	CS-8E	$1,017
5.	Soil/Sludge/Sediment Sampling & Analysis	CS-8F	$508
TOTAL SAMPLING AND ANALYSIS COST (Add lines 1 through 5) (Enter total on Worksheet CS-1, line 6)			**$2,491**

The information entered on this inventory worksheet will be used in completing the appropriate cost estimating worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES

In the space below, identify the number of boreholes and the number of subsurface soil samples per borehole to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

1	**Number of Subsurface Soil Samples** **Boring Diameter:**	**boreholes**	**samples/borehole**	0	**total samples**

2 NUMBER OF CONCRETE CORE SAMPLES

In the space below, identify the number of concrete core samples to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

2	**Number of Concrete Core Samples**	1	**total samples**

3 NUMBER OF WIPE SAMPLES

In the space below, identify the number of sample locations and the number of wipe samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

3	**Number of Wipe Samples**	**locations**	**samples/location**	1	**total samples**

4 NUMBER OF SURFACE WATER/LIQUID SAMPLES

In the space below, identify the number of grab samples on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.

4	**Number of Aqueous Samples**	**locations**	**samples/location**	2	**total samples**

5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES

In the space below, identify the number of grab samples of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

5	**Number of Nonaqueous Samples**			
		locations	**samples/location**	1 **total samples**

Coring may be necessary to collect samples from hard surfaces, such as concrete.

1	**COLLECTING CONCRETE CORE SAMPLES**		
1.A	Number of concrete core samples to be collected (Enter from worksheet CS-8A, line 2)	1 core samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate to drill a 3-inch-diameter core sample boring to a depth of 6 inches[c]	work hr/sample	
1.E	Number of hours required to drill 3-inch-diameter borings (Multiply line 1.A by Line 1.D) (One hour minimum; round up to the half-hour)	1.0 work hrs	
1.F	**Cost to Collect Concrete Core Samples (Multiply line 1.C by line 1.E)**		**$41**
2	**ANALYZING CONCRETE CORE SAMPLES**		
2.A	Determine the cost of analysis per sampling event for concrete core samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Enter the number of sampling events	3 events	
2.C	**Cost to Analyze Concrete Core Samples (Multiply line 2.A by line 2.B)**		**$417**
	TOTAL COST OF COLLECTION AND ANALYSIS OF CONCRETE CORE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 2)		**$458**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect concrete core samples.

[c] Enter the estimated number of work hours required to drill one 3-inch-diameter core sample boring to a depth of 6 inches. If, for example, it is estimated that it will take 45 minutes to drill one 3-inch-diameter core sample boring, enter a work rate of 0.750 (45 divided by 60) for conducting that activity. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all its sampling equipment. If an estimate of the total number of hours required to drill 3-inch-diameter core sample borings has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1	**COLLECTING WIPE SAMPLES**		
1.A	Number of wipe samples to be collected (Enter from worksheet CS-8A, line 3)	1 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.0 work hrs	
1.F	**Cost to Collect Wipe Samples (Multiply line 1.C by line 1.E)**		**$91**
2	**ANALYZING WIPE SAMPLES**		
2.A	Cost of analysis per sampling event for wipe samples (Enter from page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	3 events	
2.C	**Cost to Analyze Wipe Samples (Multiply line 2.A by line 2.B)**		**$417**
	TOTAL COST OF COLLECTION AND ANALYSIS OF WIPE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 3)		**$508**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.

[c] Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Surface water/liquid samples are grab samples taken on lakes, rivers, or ponds or samples of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLLECTING SURFACE WATER/LIQUID SAMPLES			
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet CS-8A, line 4)	2 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]		
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	2.0 work hrs	
1.F	**Cost to Collect Surface Water/Liquid Samples (Multiply line 1.C by line 1.E)**		**$183**
2 ANALYZING SURFACE WATER/LIQUID SAMPLES			
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	6 events	
2.C	**Cost to Analyze Surface Water/Liquid Samples (Multiply line 2.A by line 2.B)**		**$834**
	TOTAL COST OF COLLECTION AND ANALYSIS OF AQUEOUS SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 4)		**$1,017**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect aqueous samples.

[c] Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Soil/sludge/sediment samples are grab samples of surface soil, sludge, sediment, or concrete chips. Such samples are shallow samples, that is, they are typically collected at depths of less than 1.5 feet below the ground surface.

1	**COLLECTING SOIL/SLUDGE/SEDIMENT SAMPLES**		
1.A	Number of soil/sludge/sediment samples to be collected (Enter from worksheet CS-8A, line 5)	1 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.0 work hrs	
1.F	**Cost to Collect Soil/Sludge/Sediment Samples (Multiply line 1.C by line 1.E)**		**$91**
2	**ANALYZING SOIL/SLUDGE/SEDIMENT SAMPLES**		
2.A	Cost of analysis per sampling event for soil/sludge/sediment samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	3 events	
2.C	**Cost to Analyze Soil/Sludge/Sediment Samples (Multiply line 2.A by line 2.B)**		**$417**
	TOTAL COST OF COLLECTION AND ANALYSIS OF SOIL/SLUDGE/SEDIMENT SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 5)		**$508**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect soil/sludge/sediment samples.

[c] Enter the estimated number of work hours required to collect one soil/sludge/sediment sample. If, for example, it is estimated that it will take 10 minutes per sample to collect soil/sludge/sediment samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect soil/sludge/sediment samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Depending on the activities being conducted, it may not be necessary to complete all sections of this worksheet.

1	**TRANSPORTATION OF WASTE IN DRUMS**		
1.A	Number of drums of waste	91 drums	
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)	2 truckloads	
1.D	**Cost to Transport Waste In Drums (Multiply line 1.B by line 1.C)**		**$2,175**
2	**TRANSPORTATION OF BULK LIQUIDS**		
2.A	Gallons of liquid waste	gal	
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	truckloads	
2.D	**Cost to Transport Bulk Liquid Waste (Multiply line 2.B by line 2.C)**		**$**
3	**TRANSPORTATION OF BULK WASTE**		
3.A	Number of waste debris boxes	debris boxes	
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
3.C	**Cost to Transport Bulk Solid Waste (assume one debris box can be hauled on each truck) (Multiply line 3.A by line 3.B)**		**$**
	TOTAL COST TO TRANSPORT WASTE (Add lines 1.D, 2.D, and 3.C) (Enter total on Worksheet CS-1, line 7)		**$2,175**

TREATMENT AND DISPOSAL SUMMARY SHEET - Page 1 of 1

Facility Name: CSA 5,000 Gallons

SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost ($)
1.	Treatment and Disposal of Waste	CS-10A	
2.	Transportation and Disposal of Decontamination Fluids	CS-10B	$3,554
TOTAL COST OF TREATMENT AND DISPOSAL *(Add lines 1 and 2)* *(Enter total on Worksheet CS-1, line 8)*			**$3,554**

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. _____ gal _____ gal _____ gal _____ gal _____ gal	2,996 total gal	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon)[c]	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	1 work hours	
6	Subtotal of labor and equipment cost to pump decontamination fluid to a holding tank (multiply line 3 by line 5)		$43
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	$ /day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	1 tanks	
10	Subtotal of tank rental costs (Multiply lines 7, 8, and 9)		$365
11	Removal cost per gallon of bulk liquid[d]	$ /gal	
12	Subtotal of removal cost for bulk liquids (Multiply line 1 by line 11)		$3,146
TOTAL COST TO TRANSPORT AND DISPOSE OF DECONTAMINATION FLUID AS A BULK LIQUID (Add lines 6, 10, and 12) (Enter total on Worksheet CS-10, line 2)			**$3,554**

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.

[c] Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

CONTAINER STORAGE AREAS CS-11

CERTIFICATION OF CLOSURE - Page 1 of 1

1	Number of units requiring certification of closure[a]	1	
2	Cost of certification of closure per unit[b]	$	
TOTAL COST OF CERTIFICATION OF CLOSURE (Multiply line 1 by line 2) (Enter total on Worksheet CS-1, line 11)			**$3,640**

Notes:

[a] Facilities closing multiple container storage areas in the same manner at the same time should incur cost of certification of closure only once.

[b] This cost includes the cost of performance of the following activities by a registered professional engineer: 1) reviewing the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A CSA CAPACITY 10,000 GALLONS

Facility Name: CSA 10,000 Gallons

SUMMARY WORKSHEET

	Activity **Some of the activities listed below are conducted routinely as part of closure. The owner or operator, however, might intend or be required to conduct certain additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type.**	Worksheet Number	Cost ($)
1.	Removal of Waste	CS-3	
2.	*Demolition and Removal of Containment System*	CS-4	
3.	*Removal of Soil*	CS-5	
4.	*Backfill*	CS-6	
5.	Decontamination	CS-7	$1,511
6.	Sampling and Analysis	CS-8	$3,000
7.	Transportation	CS-9	$3,263
8.	Treatment and Disposal	CS-10	$6,594
9.	**Subtotal of Closure Costs (Add lines 1 through 8)**		**$14,368**
10.	Engineering Expenses (approximately 10% of closure costs, excluding certification of closure) (Multiply line 9 by 0.10)		$1,437
11.	Certification of Closure	CS-11	$3,640
12.	**Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 9, 10, and 11)**		**$19,445**
13.	Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 12 by 0.20)		$3,889
	TOTAL COST OF CLOSURE (Add lines 12 and 13)		**$23,334**

CONTAINER STORAGE AREAS CS-2

The information entered on this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the costs of closure for container storage areas. If the design characteristics of the container storage area to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures and materials to be removed.[a] Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete each section of this inventory worksheet.

1 MAXIMUM PERMITTED CAPACITY

Determine the maximum permitted capacity of the container storage area to determine the cost of waste disposal.

1.A	**Volume of Waste**	**10,000**	**gal**

2 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure. Calculate the surface area of the secondary containment system pad to determine the costs of decontaminating and demolishing the pad.

2.A	Length (excluding any curbs or berm)	ft	
2.B	Width (excluding any curbs or berm)	ft	
2.C	**Surface Area of Containment System Pad (Multiply line 2.A by line 2.B)**	**1,447.7**	**ft^2**
2.D	**Surface Area of Containment System Pad in yd^2 (Divide line 2.C by 9)**	**160.9**	**yd^2**

3 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure. Calculate the volume of the secondary containment system pad to determine the cost of removal.

3.A	Thickness	ft	
3.B	Thickness in yards (Divide line 3.A by 3)	yd	
3.C	**Volume of Containment System Pad (Multiply line 2.D by line 3.B)**		**yd^3**

DECONTAMINATION SUMMARY WORKSHEET - Page 1 of 1

Facility Name: CSA 10,000 Gallons

DECONTAMINATION SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	CS-7A	$1,473
2.	Decontamination of Unit by Sandblasting	CS-7B	$
3.	Decontamination of Heavy Equipment	CS-7C	$38
TOTAL COST OF DECONTAMINATION (Add lines 1, 2, and 3) (Enter total on Worksheet CS-1, line 5)			**$1,511**

1	Area of unit to be decontaminated (Enter from Worksheet CS-2; add lines 2.C, 4.C, and 6.A)	1,447.7 ft^2	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to steam clean or pressure wash one ft^2[c]	work hrs/ft^2	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	39.5 work hrs	
6	Subtotal of labor and equipment costs to decontaminate the unit by steam cleaning or pressure washing (Multiply line 3 by line 5)		$1,473
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft^2)[d] (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	5,791 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)		$0
TOTAL COST OF DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING (For bulk liquids, enter from line 6. For liquids in drums, add lines 6 and 10.) (Enter total on Worksheet CS-7, line 1)			**$1,473**

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.

[c] Enter the estimated number of work hours required to steam clean or pressure wash one ft^2 of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft^2 of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] U.S. Environmental Protection Agency, *Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H)*, November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative rates may be used, as appropriate.

1	Number of hours needed to decontaminate all heavy equipment used during closure of the unit (Enter from Page 3 of 3 of this worksheet)	1 work hrs	
2	Cost of rental of steam cleaner per hour	$ /hr	
3	Subtotal steam cleaner rental costs (Multiply line 1 by line 2)		$6
4	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
5	Labor cost per work hour[b]	$	
6	Subtotal of labor costs (Multiply line 1 by line 5)		$32
7	Volume of decontamination fluid (Multiply line 1 by 100 gallons per hour) (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation, treatment, and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	100 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum and round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums (Multiply line 8 by line 9)		$0
11	Cost of construction of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**		$0

12	Cost of demolition of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**	$0
TOTAL COST OF DECONTAMINATION OF HEAVY EQUIPMENT (Add lines 3, 6, 10, 11, and 12) (Enter total on worksheet CS-7, line 3)		**$38**

Remember to calculate costs for transporting, treating, and disposing of all wastes in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor required to decontaminate heavy equipment.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: CSA 10,000 Gallons

SAMPLING AND ANALYSIS SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Drilling and Subsurface Soil Sampling & Analysis	CS-8B	$0
2.	Concrete Core Sampling & Analysis	CS-8C	$458
3.	Wipe Sampling & Analysis	CS-8D	$508
4.	Surface Water/Liquid Sampling & Analysis	CS-8E	$1,017
5.	Soil/Sludge/Sediment Sampling & Analysis	CS-8F	$1,017
TOTAL SAMPLING AND ANALYSIS COST (Add lines 1 through 5) (Enter total on Worksheet CS-1, line 6)			**$3,000**

The information entered on this inventory worksheet will be used in completing the appropriate cost estimating worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES

In the space below, identify the number of boreholes and the number of subsurface soil samples per borehole to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

1	**Number of Subsurface Soil Samples** **Boring Diameter:**	**boreholes**	**samples/borehole**	0	**total samples**

2 NUMBER OF CONCRETE CORE SAMPLES

In the space below, identify the number of concrete core samples to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

2	**Number of Concrete Core Samples**	1	**total samples**

3 NUMBER OF WIPE SAMPLES

In the space below, identify the number of sample locations and the number of wipe samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

3	**Number of Wipe Samples**	**locations**	**samples/location**	1	**total samples**

4 NUMBER OF SURFACE WATER/LIQUID SAMPLES

In the space below, identify the number of grab samples on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.

4	**Number of Aqueous Samples**	**locations**	**samples/location**	2	**total samples**

5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES

In the space below, identify the number of grab samples of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

5	**Number of Nonaqueous Samples**			
		locations	**samples/location**	2 **total samples**

Coring may be necessary to collect samples from hard surfaces, such as concrete.

1	**COLLECTING CONCRETE CORE SAMPLES**		
1.A	Number of concrete core samples to be collected (Enter from worksheet CS-8A, line 2)	1 core samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate to drill a 3-inch-diameter core sample boring to a depth of 6 inches[c]	work hr/sample	
1.E	Number of hours required to drill 3-inch-diameter borings (Multiply line 1.A by Line 1.D) (One hour minimum; round up to the half-hour)	1.0 work hrs	
1.F	**Cost to Collect Concrete Core Samples (Multiply line 1.C by line 1.E)**		**$41**
2	**ANALYZING CONCRETE CORE SAMPLES**		
2.A	Determine the cost of analysis per sampling event for concrete core samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Enter the number of sampling events	3 events	
2.C	**Cost to Analyze Concrete Core Samples (Multiply line 2.A by line 2.B)**		**$417**
	TOTAL COST OF COLLECTION AND ANALYSIS OF CONCRETE CORE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 2)		**$458**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect concrete core samples.

[c] Enter the estimated number of work hours required to drill one 3-inch-diameter core sample boring to a depth of 6 inches. If, for example, it is estimated that it will take 45 minutes to drill one 3-inch-diameter core sample boring, enter a work rate of 0.750 (45 divided by 60) for conducting that activity. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all its sampling equipment. If an estimate of the total number of hours required to drill 3-inch-diameter core sample borings has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1	**COLLECTING WIPE SAMPLES**		
1.A	Number of wipe samples to be collected (Enter from worksheet CS-8A, line 3)	1 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.0 work hrs	
1.F	**Cost to Collect Wipe Samples (Multiply line 1.C by line 1.E)**		**$91**
2	**ANALYZING WIPE SAMPLES**		
2.A	Cost of analysis per sampling event for wipe samples (Enter from page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	3 events	
2.C	**Cost to Analyze Wipe Samples (Multiply line 2.A by line 2.B)**		**$417**
	TOTAL COST OF COLLECTION AND ANALYSIS OF WIPE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 3)		**$508**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.

[c] Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Surface water/liquid samples are grab samples taken on lakes, rivers, or ponds or samples of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLLECTING SURFACE WATER/LIQUID SAMPLES			
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet CS-8A, line 4)	2 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]		
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	2.0 work hrs	
1.F	**Cost to Collect Surface Water/Liquid Samples (Multiply line 1.C by line 1.E)**		**$183**
2 ANALYZING SURFACE WATER/LIQUID SAMPLES			
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	6 events	
2.C	**Cost to Analyze Surface Water/Liquid Samples (Multiply line 2.A by line 2.B)**		**$834**
	TOTAL COST OF COLLECTION AND ANALYSIS OF AQUEOUS SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 4)		**$1,017**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect aqueous samples.

[c] Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Soil/sludge/sediment samples are grab samples of surface soil, sludge, sediment, or concrete chips. Such samples are shallow samples, that is, they are typically collected at depths of less than 1.5 feet below the ground surface.

1	**COLLECTING SOIL/SLUDGE/SEDIMENT SAMPLES**		
1.A	Number of soil/sludge/sediment samples to be collected (Enter from worksheet CS-8A, line 5)	2 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	2.0 work hrs	
1.F	**Cost to Collect Soil/Sludge/Sediment Samples (Multiply line 1.C by line 1.E)**		**$183**
2	**ANALYZING SOIL/SLUDGE/SEDIMENT SAMPLES**		
2.A	Cost of analysis per sampling event for soil/sludge/sediment samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	6 events	
2.C	**Cost to Analyze Soil/Sludge/Sediment Samples (Multiply line 2.A by line 2.B)**		**$834**
	TOTAL COST OF COLLECTION AND ANALYSIS OF SOIL/SLUDGE/SEDIMENT SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 5)		**$1,017**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect soil/sludge/sediment samples.

[c] Enter the estimated number of work hours required to collect one soil/sludge/sediment sample. If, for example, it is estimated that it will take 10 minutes per sample to collect soil/sludge/sediment samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect soil/sludge/sediment samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

CONTAINER STORAGE AREAS CS-9

Facility Name: CSA 10,000 Gallons

Depending on the activities being conducted, it may not be necessary to complete all sections of this worksheet.

1 TRANSPORTATION OF WASTE IN DRUMS			
1.A	Number of drums of waste	182 drums	
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)	3 truckloads	
1.D	**Cost to Transport Waste In Drums (Multiply line 1.B by line 1.C)**		**$3,263**
2 TRANSPORTATION OF BULK LIQUIDS			
2.A	Gallons of liquid waste	gal	
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	truckloads	
2.D	**Cost to Transport Bulk Liquid Waste (Multiply line 2.B by line 2.C)**		**$**
3 TRANSPORTATION OF BULK WASTE			
3.A	Number of waste debris boxes	debris boxes	
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
3.C	**Cost to Transport Bulk Solid Waste (assume one debris box can be hauled on each truck) (Multiply line 3.A by line 3.B)**		**$**
	TOTAL COST TO TRANSPORT WASTE (Add lines 1.D, 2.D, and 3.C) (Enter total on Worksheet CS-1, line 7)		**$3,263**

Facility Name: CSA 10,000 Gallons

SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost **($)**
1.	Treatment and Disposal of Waste	CS-10A	
2.	Transportation and Disposal of Decontamination Fluids	CS-10B	$6,594
TOTAL COST OF TREATMENT AND DISPOSAL ***(Add lines 1 and 2)*** ***(Enter total on Worksheet CS-1, line 8)***			**$6,594**

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. _____ gal _____ gal _____ gal _____ gal _____ gal	5,891 total gal	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon)[c]	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	1 work hours	
6	Subtotal of labor and equipment cost to pump decontamination fluid to a holding tank (multiply line 3 by line 5)		$43
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	$ /day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	1 tanks	
10	Subtotal of tank rental costs (Multiply lines 7, 8, and 9)		$365
11	Removal cost per gallon of bulk liquid[d]	$ /gal	
12	Subtotal of removal cost for bulk liquids (Multiply line 1 by line 11)		$6,186
TOTAL COST TO TRANSPORT AND DISPOSE OF DECONTAMINATION FLUID AS A BULK LIQUID (Add lines 6, 10, and 12) (Enter total on Worksheet CS-10, line 2)			**$6,594**

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.

[c] Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

CONTAINER STORAGE AREAS CS-11

CERTIFICATION OF CLOSURE - Page 1 of 1

1	Number of units requiring certification of closure[a]	1	
2	Cost of certification of closure per unit[b]	$	
TOTAL COST OF CERTIFICATION OF CLOSURE (Multiply line 1 by line 2) (Enter total on Worksheet CS-1, line 11)			**$3,640**

Notes:

[a] Facilities closing multiple container storage areas in the same manner at the same time should incur cost of certification of closure only once.

[b] This cost includes the cost of performance of the following activities by a registered professional engineer: 1) reviewing the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A CSA CAPACITY 15,000 GALLONS

Facility Name: CSA 15,000 Gallons

SUMMARY WORKSHEET

	Activity **Some of the activities listed below are conducted routinely as part of closure. The owner or operator, however, might intend or be required to conduct certain additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type.**	Worksheet Number	Cost ($)
1.	Removal of Waste	CS-3	
2.	*Demolition and Removal of Containment System*	CS-4	
3.	*Removal of Soil*	CS-5	
4.	*Backfill*	CS-6	
5.	Decontamination	CS-7	$2,238
6.	Sampling and Analysis	CS-8	$4,433
7.	Transportation	CS-9	$4,350
8.	Treatment and Disposal	CS-10	$9,633
9.	**Subtotal of Closure Costs (Add lines 1 through 8)**		**$20,654**
10.	Engineering Expenses (approximately 10% of closure costs, excluding certification of closure) (Multiply line 9 by 0.10)		$2,065
11.	Certification of Closure	CS-11	$3,640
12.	**Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 9, 10, and 11)**		**$26,359**
13.	Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 12 by 0.20)		$5,272
	TOTAL COST OF CLOSURE (Add lines 12 and 13)		**$31,631**

CONTAINER STORAGE AREAS CS-2

The information entered on this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the costs of closure for container storage areas. If the design characteristics of the container storage area to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures and materials to be removed.[a] Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete each section of this inventory worksheet.

1
MAXIMUM PERMITTED CAPACITY

Determine the maximum permitted capacity of the container storage area to determine the cost of waste disposal.

1.A	**Volume of Waste**	**15,000**	**gal**

2
SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure. Calculate the surface area of the secondary containment system pad to determine the costs of decontaminating and demolishing the pad.

2.A	Length (excluding any curbs or berm)	ft	
2.B	Width (excluding any curbs or berm)	ft	
2.C	**Surface Area of Containment System Pad (Multiply line 2.A by line 2.B)**	**2,171.6**	**ft^2**
2.D	**Surface Area of Containment System Pad in yd^2 (Divide line 2.C by 9)**	**241.3**	**yd^2**

3
VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure. Calculate the volume of the secondary containment system pad to determine the cost of removal.

3.A	Thickness	ft	
3.B	Thickness in yards (Divide line 3.A by 3)	yd	
3.C	**Volume of Containment System Pad (Multiply line 2.D by line 3.B)**		**yd^3**

DECONTAMINATION SUMMARY WORKSHEET - Page 1 of 1

Facility Name: CSA 15,000 Gallons

DECONTAMINATION SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	CS-7A	$2,200
2.	Decontamination of Unit by Sandblasting	CS-7B	$
3.	Decontamination of Heavy Equipment	CS-7C	$38
TOTAL COST OF DECONTAMINATION (Add lines 1, 2, and 3) (Enter total on Worksheet CS-1, line 5)			**$2,238**

1	Area of unit to be decontaminated (Enter from Worksheet CS-2; add lines 2.C, 4.C, and 6.A)	2,171.6 ft^2	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to steam clean or pressure wash one ft^2[c]	work hrs/ft^2	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	59.0 work hrs	
6	Subtotal of labor and equipment costs to decontaminate the unit by steam cleaning or pressure washing (Multiply line 3 by line 5)		$2,200
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft^2)[d] (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	8,686 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)		$0
TOTAL COST OF DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING (For bulk liquids, enter from line 6. For liquids in drums, add lines 6 and 10.) (Enter total on Worksheet CS-7, line 1)			**$2,200**

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.

[c] Enter the estimated number of work hours required to steam clean or pressure wash one ft^2 of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft^2 of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] U.S. Environmental Protection Agency, *Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H)*, November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative rates may be used, as appropriate.

1	Number of hours needed to decontaminate all heavy equipment used during closure of the unit (Enter from Page 3 of 3 of this worksheet)	1 work hrs	
2	Cost of rental of steam cleaner per hour	$ /hr	
3	Subtotal steam cleaner rental costs (Multiply line 1 by line 2)		$6
4	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
5	Labor cost per work hour[b]	$	
6	Subtotal of labor costs (Multiply line 1 by line 5)		$32
7	Volume of decontamination fluid (Multiply line 1 by 100 gallons per hour) (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation, treatment, and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	100 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum and round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums (Multiply line 8 by line 9)		$0
11	Cost of construction of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**		$0

12	Cost of demolition of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**	$0
TOTAL COST OF DECONTAMINATION OF HEAVY EQUIPMENT (Add lines 3, 6, 10, 11, and 12) (Enter total on worksheet CS-7, line 3)		**$38**

Remember to calculate costs for transporting, treating, and disposing of all wastes in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor required to decontaminate heavy equipment.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: CSA 15,000 Gallons

SAMPLING AND ANALYSIS SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Drilling and Subsurface Soil Sampling & Analysis	CS-8B	$0
2.	Concrete Core Sampling & Analysis	CS-8C	$458
3.	Wipe Sampling & Analysis	CS-8D	$925
4.	Surface Water/Liquid Sampling & Analysis	CS-8E	$1,525
5.	Soil/Sludge/Sediment Sampling & Analysis	CS-8F	$1,525
TOTAL SAMPLING AND ANALYSIS COST (Add lines 1 through 5) (Enter total on Worksheet CS-1, line 6)			**$4,433**

The information entered on this inventory worksheet will be used in completing the appropriate cost estimating worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES

In the space below, identify the number of boreholes and the number of subsurface soil samples per borehole to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

1	**Number of Subsurface Soil Samples** **Boring Diameter:**	**boreholes**	**samples/borehole**	0	**total samples**

2 NUMBER OF CONCRETE CORE SAMPLES

In the space below, identify the number of concrete core samples to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

2	**Number of Concrete Core Samples**	1	**total samples**

3 NUMBER OF WIPE SAMPLES

In the space below, identify the number of sample locations and the number of wipe samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

3	**Number of Wipe Samples**	**locations**	**samples/location**	2	**total samples**

4 NUMBER OF SURFACE WATER/LIQUID SAMPLES

In the space below, identify the number of grab samples on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.

4	**Number of Aqueous Samples**	**locations**	**samples/location**	3	**total samples**

5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES

In the space below, identify the number of grab samples of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

5	**Number of Nonaqueous Samples**			
		locations	**samples/location**	3 **total samples**

Coring may be necessary to collect samples from hard surfaces, such as concrete.

1	**COLLECTING CONCRETE CORE SAMPLES**		
1.A	Number of concrete core samples to be collected (Enter from worksheet CS-8A, line 2)	1 core samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate to drill a 3-inch-diameter core sample boring to a depth of 6 inches[c]	work hr/sample	
1.E	Number of hours required to drill 3-inch-diameter borings (Multiply line 1.A by Line 1.D) (One hour minimum; round up to the half-hour)	1.0 work hrs	
1.F	**Cost to Collect Concrete Core Samples (Multiply line 1.C by line 1.E)**		**$41**
2	**ANALYZING CONCRETE CORE SAMPLES**		
2.A	Determine the cost of analysis per sampling event for concrete core samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Enter the number of sampling events	3 events	
2.C	**Cost to Analyze Concrete Core Samples (Multiply line 2.A by line 2.B)**		**$417**
	TOTAL COST OF COLLECTION AND ANALYSIS OF CONCRETE CORE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 2)		**$458**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect concrete core samples.

[c] Enter the estimated number of work hours required to drill one 3-inch-diameter core sample boring to a depth of 6 inches. If, for example, it is estimated that it will take 45 minutes to drill one 3-inch-diameter core sample boring, enter a work rate of 0.750 (45 divided by 60) for conducting that activity. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all its sampling equipment. If an estimate of the total number of hours required to drill 3-inch-diameter core sample borings has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1	**COLLECTING WIPE SAMPLES**		
1.A	Number of wipe samples to be collected (Enter from worksheet CS-8A, line 3)	2 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.0 work hrs	
1.F	**Cost to Collect Wipe Samples (Multiply line 1.C by line 1.E)**		**$91**
2	**ANALYZING WIPE SAMPLES**		
2.A	Cost of analysis per sampling event for wipe samples (Enter from page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	6 events	
2.C	**Cost to Analyze Wipe Samples (Multiply line 2.A by line 2.B)**		**$834**
	TOTAL COST OF COLLECTION AND ANALYSIS OF WIPE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 3)		**$925**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.

[c] Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Surface water/liquid samples are grab samples taken on lakes, rivers, or ponds or samples of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLLECTING SURFACE WATER/LIQUID SAMPLES			
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet CS-8A, line 4)	3 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]		
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	3.0 work hrs	
1.F	**Cost to Collect Surface Water/Liquid Samples (Multiply line 1.C by line 1.E)**		**$274**
2 ANALYZING SURFACE WATER/LIQUID SAMPLES			
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	9 events	
2.C	**Cost to Analyze Surface Water/Liquid Samples (Multiply line 2.A by line 2.B)**		**$1,251**
	TOTAL COST OF COLLECTION AND ANALYSIS OF AQUEOUS SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 4)		**$1,525**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect aqueous samples.

[c] Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Soil/sludge/sediment samples are grab samples of surface soil, sludge, sediment, or concrete chips. Such samples are shallow samples, that is, they are typically collected at depths of less than 1.5 feet below the ground surface.

1	**COLLECTING SOIL/SLUDGE/SEDIMENT SAMPLES**		
1.A	Number of soil/sludge/sediment samples to be collected (Enter from worksheet CS-8A, line 5)	3 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	3.0 work hrs	
1.F	**Cost to Collect Soil/Sludge/Sediment Samples (Multiply line 1.C by line 1.E)**		**$274**
2	**ANALYZING SOIL/SLUDGE/SEDIMENT SAMPLES**		
2.A	Cost of analysis per sampling event for soil/sludge/sediment samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	9 events	
2.C	**Cost to Analyze Soil/Sludge/Sediment Samples (Multiply line 2.A by line 2.B)**		**$1,251**
	TOTAL COST OF COLLECTION AND ANALYSIS OF SOIL/SLUDGE/SEDIMENT SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 5)		**$1,525**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect soil/sludge/sediment samples.

[c] Enter the estimated number of work hours required to collect one soil/sludge/sediment sample. If, for example, it is estimated that it will take 10 minutes per sample to collect soil/sludge/sediment samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect soil/sludge/sediment samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Depending on the activities being conducted, it may not be necessary to complete all sections of this worksheet.

1	**TRANSPORTATION OF WASTE IN DRUMS**		
1.A	Number of drums of waste	273 drums	
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)	4 truckloads	
1.D	**Cost to Transport Waste In Drums (Multiply line 1.B by line 1.C)**		**$4,350**
2	**TRANSPORTATION OF BULK LIQUIDS**		
2.A	Gallons of liquid waste	gal	
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	truckloads	
2.D	**Cost to Transport Bulk Liquid Waste (Multiply line 2.B by line 2.C)**		**$**
3	**TRANSPORTATION OF BULK WASTE**		
3.A	Number of waste debris boxes	debris boxes	
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
3.C	**Cost to Transport Bulk Solid Waste (assume one debris box can be hauled on each truck) (Multiply line 3.A by line 3.B)**		**$**
	TOTAL COST TO TRANSPORT WASTE (Add lines 1.D, 2.D, and 3.C) (Enter total on Worksheet CS-1, line 7)		**$4,350**

Facility Name: CSA 15,000 Gallons

SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost **($)**
1.	Treatment and Disposal of Waste	CS-10A	
2.	Transportation and Disposal of Decontamination Fluids	CS-10B	$9,633
TOTAL COST OF TREATMENT AND DISPOSAL ***(Add lines 1 and 2)*** ***(Enter total on Worksheet CS-1, line 8)***			**$9,633**

CONTAINER STORAGE AREAS CS-10B

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 1 of 2

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. _____ gal _____ gal _____ gal _____ gal _____ gal	8,786 total gal	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon)[c]	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	1 work hours	
6	Subtotal of labor and equipment cost to pump decontamination fluid to a holding tank (multiply line 3 by line 5)		$43
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	$ /day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	1 tanks	
10	Subtotal of tank rental costs (Multiply lines 7, 8, and 9)		$365
11	Removal cost per gallon of bulk liquid[d]	$ /gal	
12	Subtotal of removal cost for bulk liquids (Multiply line 1 by line 11)		$9,225
TOTAL COST TO TRANSPORT AND DISPOSE OF DECONTAMINATION FLUID AS A BULK LIQUID (Add lines 6, 10, and 12) (Enter total on Worksheet CS-10, line 2)			**$9,633**

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.

[c] Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

CONTAINER STORAGE AREAS CS-11

CERTIFICATION OF CLOSURE - Page 1 of 1

1	Number of units requiring certification of closure[a]	1	
2	Cost of certification of closure per unit[b]	$	
TOTAL COST OF CERTIFICATION OF CLOSURE (Multiply line 1 by line 2) (Enter total on Worksheet CS-1, line 11)			**$3,640**

Notes:

[a] Facilities closing multiple container storage areas in the same manner at the same time should incur cost of certification of closure only once.

[b] This cost includes the cost of performance of the following activities by a registered professional engineer: 1) reviewing the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A CSA CAPACITY 20,000 GALLONS

Facility Name: CSA 20,000 Gallons

SUMMARY WORKSHEET

	Activity **Some of the activities listed below are conducted routinely as part of closure. The owner or operator, however, might intend or be required to conduct certain additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type.**	Worksheet Number	Cost ($)
1.	Removal of Waste	CS-3	
2.	*Demolition and Removal of Containment System*	CS-4	
3.	*Removal of Soil*	CS-5	
4.	*Backfill*	CS-6	
5.	Decontamination	CS-7	$2,964
6.	Sampling and Analysis	CS-8	$5,866
7.	Transportation	CS-9	$5,438
8.	Treatment and Disposal	CS-10	$13,039
9.	**Subtotal of Closure Costs (Add lines 1 through 8)**		**$27,307**
10.	Engineering Expenses (approximately 10% of closure costs, excluding certification of closure) (Multiply line 9 by 0.10)		$2,731
11.	Certification of Closure	CS-11	$3,640
12.	**Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 9, 10, and 11)**		**$33,678**
13.	Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 12 by 0.20)		$6,736
	TOTAL COST OF CLOSURE (Add lines 12 and 13)		**$40,414**

CONTAINER STORAGE AREAS CS-2

The information entered on this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the costs of closure for container storage areas. If the design characteristics of the container storage area to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures and materials to be removed.[a] Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete each section of this inventory worksheet.

1 MAXIMUM PERMITTED CAPACITY

Determine the maximum permitted capacity of the container storage area to determine the cost of waste disposal.

1.A	**Volume of Waste**	**20,000**	**gal**

2 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure. Calculate the surface area of the secondary containment system pad to determine the costs of decontaminating and demolishing the pad.

2.A	Length (excluding any curbs or berm)	ft	
2.B	Width (excluding any curbs or berm)	ft	
2.C	**Surface Area of Containment System Pad (Multiply line 2.A by line 2.B)**	**2,895.5**	**ft^2**
2.D	**Surface Area of Containment System Pad in yd^2 (Divide line 2.C by 9)**	**321.7**	**yd^2**

3 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure. Calculate the volume of the secondary containment system pad to determine the cost of removal.

3.A	Thickness	ft	
3.B	Thickness in yards (Divide line 3.A by 3)	yd	
3.C	**Volume of Containment System Pad (Multiply line 2.D by line 3.B)**		**yd^3**

DECONTAMINATION SUMMARY WORKSHEET - Page 1 of 1

Facility Name: CSA 20,000 Gallons

DECONTAMINATION SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	CS-7A	$2,926
2.	Decontamination of Unit by Sandblasting	CS-7B	$
3.	Decontamination of Heavy Equipment	CS-7C	$38
TOTAL COST OF DECONTAMINATION (Add lines 1, 2, and 3) (Enter total on Worksheet CS-1, line 5)			**$2,964**

1	Area of unit to be decontaminated (Enter from Worksheet CS-2; add lines 2.C, 4.C, and 6.A)	2,895.5 ft^2	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to steam clean or pressure wash one ft^2[c]	work hrs/ft^2	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	78.5 work hrs	
6	Subtotal of labor and equipment costs to decontaminate the unit by steam cleaning or pressure washing (Multiply line 3 by line 5)		$2,926
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft^2)[d] (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	11,582 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)		$0
TOTAL COST OF DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING (For bulk liquids, enter from line 6. For liquids in drums, add lines 6 and 10.) (Enter total on Worksheet CS-7, line 1)			**$2,926**

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.

[c] Enter the estimated number of work hours required to steam clean or pressure wash one ft^2 of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft^2 of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] U.S. Environmental Protection Agency, *Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H)*, November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative rates may be used, as appropriate.

1	Number of hours needed to decontaminate all heavy equipment used during closure of the unit (Enter from Page 3 of 3 of this worksheet)	1 work hrs	
2	Cost of rental of steam cleaner per hour	$ /hr	
3	Subtotal steam cleaner rental costs (Multiply line 1 by line 2)		$6
4	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
5	Labor cost per work hour[b]	$	
6	Subtotal of labor costs (Multiply line 1 by line 5)		$32
7	Volume of decontamination fluid (Multiply line 1 by 100 gallons per hour) (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation, treatment, and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	100 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum and round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums (Multiply line 8 by line 9)		$0
11	Cost of construction of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**		$0

12	Cost of demolition of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**	$0
TOTAL COST OF DECONTAMINATION OF HEAVY EQUIPMENT (Add lines 3, 6, 10, 11, and 12) (Enter total on worksheet CS-7, line 3)		**$38**

Remember to calculate costs for transporting, treating, and disposing of all wastes in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor required to decontaminate heavy equipment.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: CSA 20,000 Gallons

SAMPLING AND ANALYSIS SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Drilling and Subsurface Soil Sampling & Analysis	CS-8B	$0
2.	Concrete Core Sampling & Analysis	CS-8C	$875
3.	Wipe Sampling & Analysis	CS-8D	$925
4.	Surface Water/Liquid Sampling & Analysis	CS-8E	$2,033
5.	Soil/Sludge/Sediment Sampling & Analysis	CS-8F	$2,033
TOTAL SAMPLING AND ANALYSIS COST (Add lines 1 through 5) (Enter total on Worksheet CS-1, line 6)			**$5,866**

The information entered on this inventory worksheet will be used in completing the appropriate cost estimating worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES

In the space below, identify the number of boreholes and the number of subsurface soil samples per borehole to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

1	**Number of Subsurface Soil Samples**				
	Boring Diameter:				
		boreholes	**samples/borehole**	0	**total samples**

2 NUMBER OF CONCRETE CORE SAMPLES

In the space below, identify the number of concrete core samples to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

2	**Number of Concrete Core Samples**			2	**total samples**

3 NUMBER OF WIPE SAMPLES

In the space below, identify the number of sample locations and the number of wipe samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

3	**Number of Wipe Samples**				
		locations	**samples/location**	2	**total samples**

4 NUMBER OF SURFACE WATER/LIQUID SAMPLES

In the space below, identify the number of grab samples on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.

4	**Number of Aqueous Samples**				
		locations	**samples/location**	4	**total samples**

5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES

In the space below, identify the number of grab samples of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

5	**Number of Nonaqueous Samples**			
		locations	**samples/location**	4 **total samples**

Coring may be necessary to collect samples from hard surfaces, such as concrete.

1	**COLLECTING CONCRETE CORE SAMPLES**		
1.A	Number of concrete core samples to be collected (Enter from worksheet CS-8A, line 2)	2 core samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate to drill a 3-inch-diameter core sample boring to a depth of 6 inches[c]	work hr/sample	
1.E	Number of hours required to drill 3-inch-diameter borings (Multiply line 1.A by Line 1.D) (One hour minimum; round up to the half-hour)	1.0 work hrs	
1.F	**Cost to Collect Concrete Core Samples (Multiply line 1.C by line 1.E)**		**$41**
2	**ANALYZING CONCRETE CORE SAMPLES**		
2.A	Determine the cost of analysis per sampling event for concrete core samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Enter the number of sampling events	6 events	
2.C	**Cost to Analyze Concrete Core Samples (Multiply line 2.A by line 2.B)**		**$834**
	TOTAL COST OF COLLECTION AND ANALYSIS OF CONCRETE CORE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 2)		**$875**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect concrete core samples.

[c] Enter the estimated number of work hours required to drill one 3-inch-diameter core sample boring to a depth of 6 inches. If, for example, it is estimated that it will take 45 minutes to drill one 3-inch-diameter core sample boring, enter a work rate of 0.750 (45 divided by 60) for conducting that activity. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all its sampling equipment. If an estimate of the total number of hours required to drill 3-inch-diameter core sample borings has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1	**COLLECTING WIPE SAMPLES**		
1.A	Number of wipe samples to be collected (Enter from worksheet CS-8A, line 3)	2 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.0 work hrs	
1.F	**Cost to Collect Wipe Samples (Multiply line 1.C by line 1.E)**		**$91**
2	**ANALYZING WIPE SAMPLES**		
2.A	Cost of analysis per sampling event for wipe samples (Enter from page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	6 events	
2.C	**Cost to Analyze Wipe Samples (Multiply line 2.A by line 2.B)**		**$834**
	TOTAL COST OF COLLECTION AND ANALYSIS OF WIPE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 3)		**$925**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.

[c] Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Surface water/liquid samples are grab samples taken on lakes, rivers, or ponds or samples of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLLECTING SURFACE WATER/LIQUID SAMPLES			
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet CS-8A, line 4)	4 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]		
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	4.0 work hrs	
1.F	**Cost to Collect Surface Water/Liquid Samples (Multiply line 1.C by line 1.E)**		**$365**
2 ANALYZING SURFACE WATER/LIQUID SAMPLES			
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	12 events	
2.C	**Cost to Analyze Surface Water/Liquid Samples (Multiply line 2.A by line 2.B)**		**$1,668**
	TOTAL COST OF COLLECTION AND ANALYSIS OF AQUEOUS SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 4)		**$2,033**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect aqueous samples.

[c] Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Soil/sludge/sediment samples are grab samples of surface soil, sludge, sediment, or concrete chips. Such samples are shallow samples, that is, they are typically collected at depths of less than 1.5 feet below the ground surface.

1	**COLLECTING SOIL/SLUDGE/SEDIMENT SAMPLES**		
1.A	Number of soil/sludge/sediment samples to be collected (Enter from worksheet CS-8A, line 5)	4 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	4.0 work hrs	
1.F	**Cost to Collect Soil/Sludge/Sediment Samples (Multiply line 1.C by line 1.E)**		**$365**
2	**ANALYZING SOIL/SLUDGE/SEDIMENT SAMPLES**		
2.A	Cost of analysis per sampling event for soil/sludge/sediment samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	12 events	
2.C	**Cost to Analyze Soil/Sludge/Sediment Samples (Multiply line 2.A by line 2.B)**		**$1,668**
	TOTAL COST OF COLLECTION AND ANALYSIS OF SOIL/SLUDGE/SEDIMENT SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 5)		**$2,033**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect soil/sludge/sediment samples.

[c] Enter the estimated number of work hours required to collect one soil/sludge/sediment sample. If, for example, it is estimated that it will take 10 minutes per sample to collect soil/sludge/sediment samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect soil/sludge/sediment samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Depending on the activities being conducted, it may not be necessary to complete all sections of this worksheet.

1	**TRANSPORTATION OF WASTE IN DRUMS**		
1.A	Number of drums of waste	364 drums	
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)	5 truckloads	
1.D	**Cost to Transport Waste In Drums (Multiply line 1.B by line 1.C)**		**$5,438**
2	**TRANSPORTATION OF BULK LIQUIDS**		
2.A	Gallons of liquid waste	gal	
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	truckloads	
2.D	**Cost to Transport Bulk Liquid Waste (Multiply line 2.B by line 2.C)**		**$**
3	**TRANSPORTATION OF BULK WASTE**		
3.A	Number of waste debris boxes	debris boxes	
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
3.C	**Cost to Transport Bulk Solid Waste (assume one debris box can be hauled on each truck) (Multiply line 3.A by line 3.B)**		**$**
	TOTAL COST TO TRANSPORT WASTE (Add lines 1.D, 2.D, and 3.C) (Enter total on Worksheet CS-1, line 7)		**$5,438**

Facility Name: CSA 20,000 Gallons

SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost **($)**
1.	Treatment and Disposal of Waste	CS-10A	
2.	Transportation and Disposal of Decontamination Fluids	CS-10B	$13,039
TOTAL COST OF TREATMENT AND DISPOSAL ***(Add lines 1 and 2)*** ***(Enter total on Worksheet CS-1, line 8)***			**$13,039**

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. _____ gal _____ gal _____ gal _____ gal _____ gal	11,682 total gal	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon)[c]	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	1 work hours	
6	Subtotal of labor and equipment cost to pump decontamination fluid to a holding tank (multiply line 3 by line 5)		$43
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	$ /day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	2 tanks	
10	Subtotal of tank rental costs (Multiply lines 7, 8, and 9)		$730
11	Removal cost per gallon of bulk liquid[d]	$ /gal	
12	Subtotal of removal cost for bulk liquids (Multiply line 1 by line 11)		$12,266
TOTAL COST TO TRANSPORT AND DISPOSE OF DECONTAMINATION FLUID AS A BULK LIQUID (Add lines 6, 10, and 12) (Enter total on Worksheet CS-10, line 2)			**$13,039**

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.

[c] Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

CONTAINER STORAGE AREAS CS-11

CERTIFICATION OF CLOSURE - Page 1 of 1

1	Number of units requiring certification of closure[a]	1	
2	Cost of certification of closure per unit[b]	$	
TOTAL COST OF CERTIFICATION OF CLOSURE (Multiply line 1 by line 2) (Enter total on Worksheet CS-1, line 11)			**$3,640**

Notes:

[a] Facilities closing multiple container storage areas in the same manner at the same time should incur cost of certification of closure only once.

[b] This cost includes the cost of performance of the following activities by a registered professional engineer: 1) reviewing the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A CSA CAPACITY 25,000 GALLONS

Facility Name: CSA 25,000 Gallons

SUMMARY WORKSHEET

	Activity **Some of the activities listed below are conducted routinely as part of closure. The owner or operator, however, might intend or be required to conduct certain additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type.**	Worksheet Number	Cost ($)
1.	Removal of Waste	CS-3	
2.	*Demolition and Removal of Containment System*	CS-4	
3.	*Removal of Soil*	CS-5	
4.	*Backfill*	CS-6	
5.	Decontamination	CS-7	$3,691
6.	Sampling and Analysis	CS-8	$7,345
7.	Transportation	CS-9	$6,525
8.	Treatment and Disposal	CS-10	$16,100
9.	**Subtotal of Closure Costs (Add lines 1 through 8)**		**$33,661**
10.	Engineering Expenses (approximately 10% of closure costs, excluding certification of closure) (Multiply line 9 by 0.10)		$3,366
11.	Certification of Closure	CS-11	$3,640
12.	**Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 9, 10, and 11)**		**$40,667**
13.	Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 12 by 0.20)		$8,133
	TOTAL COST OF CLOSURE (Add lines 12 and 13)		**$48,800**

CONTAINER STORAGE AREAS CS-2

The information entered on this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the costs of closure for container storage areas. If the design characteristics of the container storage area to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures and materials to be removed.[a] Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete each section of this inventory worksheet.

1 MAXIMUM PERMITTED CAPACITY

Determine the maximum permitted capacity of the container storage area to determine the cost of waste disposal.

1.A	**Volume of Waste**	**25,000**	**gal**

2 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure. Calculate the surface area of the secondary containment system pad to determine the costs of decontaminating and demolishing the pad.

2.A	Length (excluding any curbs or berm)	ft	
2.B	Width (excluding any curbs or berm)	ft	
2.C	**Surface Area of Containment System Pad (Multiply line 2.A by line 2.B)**	**3,619.3**	**ft^2**
2.D	**Surface Area of Containment System Pad in yd^2 (Divide line 2.C by 9)**	**402.1**	**yd^2**

3 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure. Calculate the volume of the secondary containment system pad to determine the cost of removal.

3.A	Thickness	ft	
3.B	Thickness in yards (Divide line 3.A by 3)	yd	
3.C	**Volume of Containment System Pad (Multiply line 2.D by line 3.B)**		**yd^3**

DECONTAMINATION SUMMARY WORKSHEET - Page 1 of 1

Facility Name: CSA 25,000 Gallons

DECONTAMINATION SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	CS-7A	$3,653
2.	Decontamination of Unit by Sandblasting	CS-7B	$
3.	Decontamination of Heavy Equipment	CS-7C	$38
TOTAL COST OF DECONTAMINATION (Add lines 1, 2, and 3) (Enter total on Worksheet CS-1, line 5)			**$3,691**

1	Area of unit to be decontaminated (Enter from Worksheet CS-2; add lines 2.C, 4.C, and 6.A)	3,619.3 ft^2	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to steam clean or pressure wash one ft^2[c]	work hrs/ft^2	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	98.0 work hrs	
6	Subtotal of labor and equipment costs to decontaminate the unit by steam cleaning or pressure washing (Multiply line 3 by line 5)		$3,653
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft^2)[d] (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	14,477 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)		$0
TOTAL COST OF DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING (For bulk liquids, enter from line 6. For liquids in drums, add lines 6 and 10.) (Enter total on Worksheet CS-7, line 1)			**$3,653**

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.

[c] Enter the estimated number of work hours required to steam clean or pressure wash one ft^2 of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft^2 of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] U.S. Environmental Protection Agency, *Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H)*, November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative rates may be used, as appropriate.

1	Number of hours needed to decontaminate all heavy equipment used during closure of the unit (Enter from Page 3 of 3 of this worksheet)	1 work hrs	
2	Cost of rental of steam cleaner per hour	$ /hr	
3	Subtotal steam cleaner rental costs (Multiply line 1 by line 2)		$6
4	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
5	Labor cost per work hour[b]	$	
6	Subtotal of labor costs (Multiply line 1 by line 5)		$32
7	Volume of decontamination fluid (Multiply line 1 by 100 gallons per hour) (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation, treatment, and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	100 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum and round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums (Multiply line 8 by line 9)		$0
11	Cost of construction of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**		$0

12	Cost of demolition of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**	$0
TOTAL COST OF DECONTAMINATION OF HEAVY EQUIPMENT (Add lines 3, 6, 10, 11, and 12) (Enter total on worksheet CS-7, line 3)		**$38**

Remember to calculate costs for transporting, treating, and disposing of all wastes in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor required to decontaminate heavy equipment.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: CSA 25,000 Gallons

SAMPLING AND ANALYSIS SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Drilling and Subsurface Soil Sampling & Analysis	CS-8B	$508
2.	Concrete Core Sampling & Analysis	CS-8C	$875
3.	Wipe Sampling & Analysis	CS-8D	$1,388
4.	Surface Water/Liquid Sampling & Analysis	CS-8E	$2,541
5.	Soil/Sludge/Sediment Sampling & Analysis	CS-8F	$2,033
TOTAL SAMPLING AND ANALYSIS COST (Add lines 1 through 5) (Enter total on Worksheet CS-1, line 6)			**$7,345**

The information entered on this inventory worksheet will be used in completing the appropriate cost estimating worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES

In the space below, identify the number of boreholes and the number of subsurface soil samples per borehole to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

1	**Number of Subsurface Soil Samples** **Boring Diameter:**	**boreholes**	**samples/borehole**	1	**total samples**

2 NUMBER OF CONCRETE CORE SAMPLES

In the space below, identify the number of concrete core samples to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

2	**Number of Concrete Core Samples**	2	**total samples**

3 NUMBER OF WIPE SAMPLES

In the space below, identify the number of sample locations and the number of wipe samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

3	**Number of Wipe Samples**	**locations**	**samples/location**	3	**total samples**

4 NUMBER OF SURFACE WATER/LIQUID SAMPLES

In the space below, identify the number of grab samples on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.

4	**Number of Aqueous Samples**	**locations**	**samples/location**	5	**total samples**

5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES

In the space below, identify the number of grab samples of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

5	**Number of Nonaqueous Samples**			
		locations	**samples/location**	4 **total samples**

Use this worksheet to estimate the cost of collecting samples of subsurface soil or rock. This worksheet assumes the use of a drill rig or other mechanical equipment to bore or core soil and rock by various drilling methods.

1	**COLLECTING SUBSURFACE SOIL SAMPLES - 2-1/2-INCH-DIAMETER BOREHOLE**		
1.A	Number of boreholes to be drilled (Enter from worksheet CS-8A, line 1)	1 boreholes	
1.B	Total depth of all boreholes (Add all depths. If the depths are not known, estimate the average depth of the boreholes to be drilled and multiply the estimated depth by line 1.A)	3.0 ft	
1.C	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
1.D	Labor and equipment cost per work hour[b]	$ /work hr	
1.E	Work rate to drill 2-1/2-inch-diameter hole[c]	work hr/ft	
1.F	Number of hours required to drill total depth of 2-1/2-inch-diameter holes (Multiply line 1.B by line 1.E) (One hour minimum; round up to the half-hour)	1.5 work hrs	
1.G	**Cost to Drill 2-1/2-inch Borings (Multiply line 1.D by line 1.F)**		**$91**
2	**COLLECTING SUBSURFACE SOIL SAMPLES - 4-INCH-DIAMETER BOREHOLE**		
2.A	Number of boreholes to be drilled (Enter from worksheet CS-8A, line 1)	boreholes	
2.B	Total depth of all boreholes (Add all depths. If the depths are not known, estimate the average depth of the boreholes to be drilled and multiply the estimated depth by line 2.A)	ft	
2.C	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
2.D	Labor and equipment cost per work hour[b]	$ /work hr	
2.E	Work rate to drill 4-inch-diameter hole[d]	work hr/ft	
2.F	Number of work hours required to drill total depth of 4-inch-diameter holes (Multiply line 2.B by line 2.E) (One hour minimum; round up to the half-hour)	work hrs	
2.G	**Cost to Drill 4-inch Borings (Multiply line 2.D by line 2.F)**		**$**

3	**ANALYZING SUBSURFACE SOIL SAMPLES**		
3.A	Determine the cost of analysis per sampling event for subsurface soil samples (Enter from Page 3 of 3 of this worksheet)	$139 /event	
3.B	Number of sampling events	3 events	
3.C	**Cost to Analyze Subsurface Soil Samples (Multiply line 3.A by line 3.B)**		**$417**
	TOTAL COST OF COLLECTION AND ANALYSIS OF SUBSURFACE SOIL SAMPLES (Add lines 1.G, 2.G, and 3.C) (Enter total on Worksheet CS-8, line 1)		**$508**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect boring and subsurface soil samples.

[c] Enter the estimated number of work hours per foot required to drill a 2½-inch-diameter hole and collect subsurface soil samples. If, for example, it is estimated that it will take 45 minutes per foot to drill a 2½-inch-diameter hole and collect a sample, enter a work rate of 0.750 (45 divided by 60) for conducting those activities. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all its sampling equipment. If an estimate of the total number of hours required to drill 2½-inch-diameter holes and collect subsurface soil samples has already been formulated, you may bypass this step and enter that number directly on line 1.F.

[d] Enter the estimated number of work hours per foot required to drill a 4-inch-diameter hole and collect subsurface soil samples. If, for example, it is estimated that it will take 45 minutes per foot to drill a 4-inch-diameter hole and collect a sample, enter a work rate of 0.750 (45 divided by 60) for drilling the hole. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to drill 4-inch holes and collect subsurface soil samples has already been formulated, you may bypass this step and enter that number directly on line 2.F.

Coring may be necessary to collect samples from hard surfaces, such as concrete.

1	**COLLECTING CONCRETE CORE SAMPLES**		
1.A	Number of concrete core samples to be collected (Enter from worksheet CS-8A, line 2)	2 core samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate to drill a 3-inch-diameter core sample boring to a depth of 6 inches[c]	work hr/sample	
1.E	Number of hours required to drill 3-inch-diameter borings (Multiply line 1.A by Line 1.D) (One hour minimum; round up to the half-hour)	1.0 work hrs	
1.F	**Cost to Collect Concrete Core Samples (Multiply line 1.C by line 1.E)**		**$41**
2	**ANALYZING CONCRETE CORE SAMPLES**		
2.A	Determine the cost of analysis per sampling event for concrete core samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Enter the number of sampling events	6 events	
2.C	**Cost to Analyze Concrete Core Samples (Multiply line 2.A by line 2.B)**		**$834**
	TOTAL COST OF COLLECTION AND ANALYSIS OF CONCRETE CORE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 2)		**$875**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect concrete core samples.

[c] Enter the estimated number of work hours required to drill one 3-inch-diameter core sample boring to a depth of 6 inches. If, for example, it is estimated that it will take 45 minutes to drill one 3-inch-diameter core sample boring, enter a work rate of 0.750 (45 divided by 60) for conducting that activity. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all its sampling equipment. If an estimate of the total number of hours required to drill 3-inch-diameter core sample borings has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1	**COLLECTING WIPE SAMPLES**		
1.A	Number of wipe samples to be collected (Enter from worksheet CS-8A, line 3)	3 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.5 work hrs	
1.F	**Cost to Collect Wipe Samples (Multiply line 1.C by line 1.E)**		**$137**
2	**ANALYZING WIPE SAMPLES**		
2.A	Cost of analysis per sampling event for wipe samples (Enter from page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	9 events	
2.C	**Cost to Analyze Wipe Samples (Multiply line 2.A by line 2.B)**		**$1,251**
	TOTAL COST OF COLLECTION AND ANALYSIS OF WIPE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 3)		**$1,388**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.

[c] Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Surface water/liquid samples are grab samples taken on lakes, rivers, or ponds or samples of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLLECTING SURFACE WATER/LIQUID SAMPLES			
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet CS-8A, line 4)	5 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]		
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	5.0 work hrs	
1.F	**Cost to Collect Surface Water/Liquid Samples (Multiply line 1.C by line 1.E)**		**$456**
2 ANALYZING SURFACE WATER/LIQUID SAMPLES			
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	15 events	
2.C	**Cost to Analyze Surface Water/Liquid Samples (Multiply line 2.A by line 2.B)**		**$2,085**
	TOTAL COST OF COLLECTION AND ANALYSIS OF AQUEOUS SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 4)		**$2,541**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect aqueous samples.

[c] Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Soil/sludge/sediment samples are grab samples of surface soil, sludge, sediment, or concrete chips. Such samples are shallow samples, that is, they are typically collected at depths of less than 1.5 feet below the ground surface.

1	**COLLECTING SOIL/SLUDGE/SEDIMENT SAMPLES**		
1.A	Number of soil/sludge/sediment samples to be collected (Enter from worksheet CS-8A, line 5)	4 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	4.0 work hrs	
1.F	**Cost to Collect Soil/Sludge/Sediment Samples (Multiply line 1.C by line 1.E)**		**$365**
2	**ANALYZING SOIL/SLUDGE/SEDIMENT SAMPLES**		
2.A	Cost of analysis per sampling event for soil/sludge/sediment samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	12 events	
2.C	**Cost to Analyze Soil/Sludge/Sediment Samples (Multiply line 2.A by line 2.B)**		**$1,668**
	TOTAL COST OF COLLECTION AND ANALYSIS OF SOIL/SLUDGE/SEDIMENT SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 5)		**$2,033**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect soil/sludge/sediment samples.

[c] Enter the estimated number of work hours required to collect one soil/sludge/sediment sample. If, for example, it is estimated that it will take 10 minutes per sample to collect soil/sludge/sediment samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect soil/sludge/sediment samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Depending on the activities being conducted, it may not be necessary to complete all sections of this worksheet.

1	**TRANSPORTATION OF WASTE IN DRUMS**		
1.A	Number of drums of waste	455 drums	
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)	6 truckloads	
1.D	**Cost to Transport Waste In Drums (Multiply line 1.B by line 1.C)**		**$6,525**
2	**TRANSPORTATION OF BULK LIQUIDS**		
2.A	Gallons of liquid waste	gal	
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	truckloads	
2.D	**Cost to Transport Bulk Liquid Waste (Multiply line 2.B by line 2.C)**		**$**
3	**TRANSPORTATION OF BULK WASTE**		
3.A	Number of waste debris boxes	debris boxes	
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
3.C	**Cost to Transport Bulk Solid Waste (assume one debris box can be hauled on each truck) (Multiply line 3.A by line 3.B)**		**$**
	TOTAL COST TO TRANSPORT WASTE (Add lines 1.D, 2.D, and 3.C) (Enter total on Worksheet CS-1, line 7)		**$6,525**

Facility Name: CSA 25,000 Gallons

SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost **($)**
1.	Treatment and Disposal of Waste	CS-10A	
2.	Transportation and Disposal of Decontamination Fluids	CS-10B	$16,100
TOTAL COST OF TREATMENT AND DISPOSAL ***(Add lines 1 and 2)*** ***(Enter total on Worksheet CS-1, line 8)***			**$16,100**

CONTAINER STORAGE AREAS CS-10B

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 1 of 2

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. _____ gal _____ gal _____ gal _____ gal _____ gal	14,577 total gal	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon)[c]	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	1 work hours	
6	Subtotal of labor and equipment cost to pump decontamination fluid to a holding tank (multiply line 3 by line 5)		$64
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	$ /day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	2 tanks	
10	Subtotal of tank rental costs (Multiply lines 7, 8, and 9)		$730
11	Removal cost per gallon of bulk liquid[d]	$ /gal	
12	Subtotal of removal cost for bulk liquids (Multiply line 1 by line 11)		$15,306
TOTAL COST TO TRANSPORT AND DISPOSE OF DECONTAMINATION FLUID AS A BULK LIQUID (Add lines 6, 10, and 12) (Enter total on Worksheet CS-10, line 2)			**$16,100**

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.

[c] Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

CONTAINER STORAGE AREAS CS-11

CERTIFICATION OF CLOSURE - Page 1 of 1

1	Number of units requiring certification of closure[a]	1	
2	Cost of certification of closure per unit[b]	$	
TOTAL COST OF CERTIFICATION OF CLOSURE (Multiply line 1 by line 2) (Enter total on Worksheet CS-1, line 11)			**$3,640**

Notes:

[a] Facilities closing multiple container storage areas in the same manner at the same time should incur cost of certification of closure only once.

[b] This cost includes the cost of performance of the following activities by a registered professional engineer: 1) reviewing the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A CSA CAPACITY 30,000 GALLONS

Facility Name: CSA 30,000 Gallons

SUMMARY WORKSHEET

	Activity **Some of the activities listed below are conducted routinely as part of closure. The owner or operator, however, might intend or be required to conduct certain additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type.**	Worksheet Number	Cost ($)
1.	Removal of Waste	CS-3	
2.	*Demolition and Removal of Containment System*	CS-4	
3.	*Removal of Soil*	CS-5	
4.	*Backfill*	CS-6	
5.	Decontamination	CS-7	$4,456
6.	Sampling and Analysis	CS-8	$8,870
7.	Transportation	CS-9	$7,613
8.	Treatment and Disposal	CS-10	$19,246
9.	**Subtotal of Closure Costs (Add lines 1 through 8)**		**$40,185**
10.	Engineering Expenses (approximately 10% of closure costs, excluding certification of closure) (Multiply line 9 by 0.10)		$4,019
11.	Certification of Closure	CS-11	$3,640
12.	**Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 9, 10, and 11)**		**$47,844**
13.	Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 12 by 0.20)		$9,569
	TOTAL COST OF CLOSURE (Add lines 12 and 13)		**$57,413**

CONTAINER STORAGE AREAS CS-2

The information entered on this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the costs of closure for container storage areas. If the design characteristics of the container storage area to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures and materials to be removed.[a] Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete each section of this inventory worksheet.

1 MAXIMUM PERMITTED CAPACITY

Determine the maximum permitted capacity of the container storage area to determine the cost of waste disposal.

1.A	**Volume of Waste**	**30,000**	**gal**

2 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure. Calculate the surface area of the secondary containment system pad to determine the costs of decontaminating and demolishing the pad.

2.A	Length (excluding any curbs or berm)	ft		
2.B	Width (excluding any curbs or berm)	ft		
2.C	**Surface Area of Containment System Pad (Multiply line 2.A by line 2.B)**		**4,343.2**	**ft^2**
2.D	**Surface Area of Containment System Pad in yd^2 (Divide line 2.C by 9)**		**482.6**	**yd^2**

3 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure. Calculate the volume of the secondary containment system pad to determine the cost of removal.

3.A	Thickness	ft		
3.B	Thickness in yards (Divide line 3.A by 3)	yd		
3.C	**Volume of Containment System Pad (Multiply line 2.D by line 3.B)**			**yd^3**

DECONTAMINATION SUMMARY WORKSHEET - Page 1 of 1

Facility Name: CSA 30,000 Gallons

DECONTAMINATION SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	CS-7A	$4,380
2.	Decontamination of Unit by Sandblasting	CS-7B	$
3.	Decontamination of Heavy Equipment	CS-7C	$76
TOTAL COST OF DECONTAMINATION (Add lines 1, 2, and 3) (Enter total on Worksheet CS-1, line 5)			**$4,456**

1	Area of unit to be decontaminated (Enter from Worksheet CS-2; add lines 2.C, 4.C, and 6.A)	4,343.2 ft^2	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to steam clean or pressure wash one ft^2[c]	work hrs/ft^2	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	117.5 work hrs	
6	Subtotal of labor and equipment costs to decontaminate the unit by steam cleaning or pressure washing (Multiply line 3 by line 5)		$4,380
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft^2)[d] (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	17,373 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)		$0
TOTAL COST OF DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING (For bulk liquids, enter from line 6. For liquids in drums, add lines 6 and 10.) (Enter total on Worksheet CS-7, line 1)			**$4,380**

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.

[c] Enter the estimated number of work hours required to steam clean or pressure wash one ft^2 of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft^2 of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] U.S. Environmental Protection Agency, *Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H)*, November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative rates may be used, as appropriate.

1	Number of hours needed to decontaminate all heavy equipment used during closure of the unit (Enter from Page 3 of 3 of this worksheet)	2 work hrs	
2	Cost of rental of steam cleaner per hour	$ /hr	
3	Subtotal steam cleaner rental costs (Multiply line 1 by line 2)		$12
4	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
5	Labor cost per work hour[b]	$	
6	Subtotal of labor costs (Multiply line 1 by line 5)		$64
7	Volume of decontamination fluid (Multiply line 1 by 100 gallons per hour) (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation, treatment, and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	200 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum and round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums (Multiply line 8 by line 9)		$0
11	Cost of construction of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**		$0

12	Cost of demolition of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**	$0
TOTAL COST OF DECONTAMINATION OF HEAVY EQUIPMENT (Add lines 3, 6, 10, 11, and 12) (Enter total on worksheet CS-7, line 3)		**$76**

Remember to calculate costs for transporting, treating, and disposing of all wastes in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor required to decontaminate heavy equipment.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: CSA 30,000 Gallons

SAMPLING AND ANALYSIS SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Drilling and Subsurface Soil Sampling & Analysis	CS-8B	$508
2.	Concrete Core Sampling & Analysis	CS-8C	$875
3.	Wipe Sampling & Analysis	CS-8D	$1,388
4.	Surface Water/Liquid Sampling & Analysis	CS-8E	$3,558
5.	Soil/Sludge/Sediment Sampling & Analysis	CS-8F	$2,541
TOTAL SAMPLING AND ANALYSIS COST (Add lines 1 through 5) (Enter total on Worksheet CS-1, line 6)			**$8,870**

The information entered on this inventory worksheet will be used in completing the appropriate cost estimating worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES

In the space below, identify the number of boreholes and the number of subsurface soil samples per borehole to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

1	**Number of Subsurface Soil Samples** **Boring Diameter:**	**boreholes**	**samples/borehole**	1	**total samples**

2 NUMBER OF CONCRETE CORE SAMPLES

In the space below, identify the number of concrete core samples to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

2	**Number of Concrete Core Samples**	2	**total samples**

3 NUMBER OF WIPE SAMPLES

In the space below, identify the number of sample locations and the number of wipe samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

3	**Number of Wipe Samples**	**locations**	**samples/location**	3	**total samples**

4 NUMBER OF SURFACE WATER/LIQUID SAMPLES

In the space below, identify the number of grab samples on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.

4	**Number of Aqueous Samples**	**locations**	**samples/location**	7	**total samples**

5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES

In the space below, identify the number of grab samples of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

5	**Number of Nonaqueous Samples**			
		locations	**samples/location**	5 **total samples**

Use this worksheet to estimate the cost of collecting samples of subsurface soil or rock. This worksheet assumes the use of a drill rig or other mechanical equipment to bore or core soil and rock by various drilling methods.

1	**COLLECTING SUBSURFACE SOIL SAMPLES - 2-1/2-INCH-DIAMETER BOREHOLE**		
1.A	Number of boreholes to be drilled (Enter from worksheet CS-8A, line 1)	1 boreholes	
1.B	Total depth of all boreholes (Add all depths. If the depths are not known, estimate the average depth of the boreholes to be drilled and multiply the estimated depth by line 1.A)	3.0 ft	
1.C	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
1.D	Labor and equipment cost per work hour[b]	$ /work hr	
1.E	Work rate to drill 2-1/2-inch-diameter hole[c]	work hr/ft	
1.F	Number of hours required to drill total depth of 2-1/2-inch-diameter holes (Multiply line 1.B by line 1.E) (One hour minimum; round up to the half-hour)	1.5 work hrs	
1.G	**Cost to Drill 2-1/2-inch Borings (Multiply line 1.D by line 1.F)**		**$91**
2	**COLLECTING SUBSURFACE SOIL SAMPLES - 4-INCH-DIAMETER BOREHOLE**		
2.A	Number of boreholes to be drilled (Enter from worksheet CS-8A, line 1)	boreholes	
2.B	Total depth of all boreholes (Add all depths. If the depths are not known, estimate the average depth of the boreholes to be drilled and multiply the estimated depth by line 2.A)	ft	
2.C	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
2.D	Labor and equipment cost per work hour[b]	$ /work hr	
2.E	Work rate to drill 4-inch-diameter hole[d]	work hr/ft	
2.F	Number of work hours required to drill total depth of 4-inch-diameter holes (Multiply line 2.B by line 2.E) (One hour minimum; round up to the half-hour)	work hrs	
2.G	**Cost to Drill 4-inch Borings (Multiply line 2.D by line 2.F)**		**$**

3	**ANALYZING SUBSURFACE SOIL SAMPLES**		
3.A	Determine the cost of analysis per sampling event for subsurface soil samples (Enter from Page 3 of 3 of this worksheet)	$139 /event	
3.B	Number of sampling events	3 events	
3.C	**Cost to Analyze Subsurface Soil Samples (Multiply line 3.A by line 3.B)**		**$417**
	TOTAL COST OF COLLECTION AND ANALYSIS OF SUBSURFACE SOIL SAMPLES (Add lines 1.G, 2.G, and 3.C) (Enter total on Worksheet CS-8, line 1)		**$508**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect boring and subsurface soil samples.

[c] Enter the estimated number of work hours per foot required to drill a 2½-inch-diameter hole and collect subsurface soil samples. If, for example, it is estimated that it will take 45 minutes per foot to drill a 2½-inch-diameter hole and collect a sample, enter a work rate of 0.750 (45 divided by 60) for conducting those activities. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all its sampling equipment. If an estimate of the total number of hours required to drill 2½-inch-diameter holes and collect subsurface soil samples has already been formulated, you may bypass this step and enter that number directly on line 1.F.

[d] Enter the estimated number of work hours per foot required to drill a 4-inch-diameter hole and collect subsurface soil samples. If, for example, it is estimated that it will take 45 minutes per foot to drill a 4-inch-diameter hole and collect a sample, enter a work rate of 0.750 (45 divided by 60) for drilling the hole. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to drill 4-inch holes and collect subsurface soil samples has already been formulated, you may bypass this step and enter that number directly on line 2.F.

Coring may be necessary to collect samples from hard surfaces, such as concrete.

1	**COLLECTING CONCRETE CORE SAMPLES**		
1.A	Number of concrete core samples to be collected (Enter from worksheet CS-8A, line 2)	2 core samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate to drill a 3-inch-diameter core sample boring to a depth of 6 inches[c]	work hr/sample	
1.E	Number of hours required to drill 3-inch-diameter borings (Multiply line 1.A by Line 1.D) (One hour minimum; round up to the half-hour)	1.0 work hrs	
1.F	**Cost to Collect Concrete Core Samples (Multiply line 1.C by line 1.E)**		**$41**
2	**ANALYZING CONCRETE CORE SAMPLES**		
2.A	Determine the cost of analysis per sampling event for concrete core samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Enter the number of sampling events	6 events	
2.C	**Cost to Analyze Concrete Core Samples (Multiply line 2.A by line 2.B)**		**$834**
	TOTAL COST OF COLLECTION AND ANALYSIS OF CONCRETE CORE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 2)		**$875**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect concrete core samples.

[c] Enter the estimated number of work hours required to drill one 3-inch-diameter core sample boring to a depth of 6 inches. If, for example, it is estimated that it will take 45 minutes to drill one 3-inch-diameter core sample boring, enter a work rate of 0.750 (45 divided by 60) for conducting that activity. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all its sampling equipment. If an estimate of the total number of hours required to drill 3-inch-diameter core sample borings has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1	**COLLECTING WIPE SAMPLES**		
1.A	Number of wipe samples to be collected (Enter from worksheet CS-8A, line 3)	3 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.5 work hrs	
1.F	**Cost to Collect Wipe Samples (Multiply line 1.C by line 1.E)**		**$137**
2	**ANALYZING WIPE SAMPLES**		
2.A	Cost of analysis per sampling event for wipe samples (Enter from page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	9 events	
2.C	**Cost to Analyze Wipe Samples (Multiply line 2.A by line 2.B)**		**$1,251**
	TOTAL COST OF COLLECTION AND ANALYSIS OF WIPE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 3)		**$1,388**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.

[c] Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Surface water/liquid samples are grab samples taken on lakes, rivers, or ponds or samples of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLLECTING SURFACE WATER/LIQUID SAMPLES			
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet CS-8A, line 4)	7 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]		
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	7.0 work hrs	
1.F	**Cost to Collect Surface Water/Liquid Samples (Multiply line 1.C by line 1.E)**		**$639**
2 ANALYZING SURFACE WATER/LIQUID SAMPLES			
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	21 events	
2.C	**Cost to Analyze Surface Water/Liquid Samples (Multiply line 2.A by line 2.B)**		**$2,919**
	TOTAL COST OF COLLECTION AND ANALYSIS OF AQUEOUS SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 4)		**$3,558**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect aqueous samples.

[c] Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Soil/sludge/sediment samples are grab samples of surface soil, sludge, sediment, or concrete chips. Such samples are shallow samples, that is, they are typically collected at depths of less than 1.5 feet below the ground surface.

1	**COLLECTING SOIL/SLUDGE/SEDIMENT SAMPLES**		
1.A	Number of soil/sludge/sediment samples to be collected (Enter from worksheet CS-8A, line 5)	5 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	5.0 work hrs	
1.F	**Cost to Collect Soil/Sludge/Sediment Samples (Multiply line 1.C by line 1.E)**		**$456**
2	**ANALYZING SOIL/SLUDGE/SEDIMENT SAMPLES**		
2.A	Cost of analysis per sampling event for soil/sludge/sediment samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	15 events	
2.C	**Cost to Analyze Soil/Sludge/Sediment Samples (Multiply line 2.A by line 2.B)**		**$2,085**
	TOTAL COST OF COLLECTION AND ANALYSIS OF SOIL/SLUDGE/SEDIMENT SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 5)		**$2,541**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect soil/sludge/sediment samples.

[c] Enter the estimated number of work hours required to collect one soil/sludge/sediment sample. If, for example, it is estimated that it will take 10 minutes per sample to collect soil/sludge/sediment samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect soil/sludge/sediment samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Depending on the activities being conducted, it may not be necessary to complete all sections of this worksheet.

1	**TRANSPORTATION OF WASTE IN DRUMS**		
1.A	Number of drums of waste	546 drums	
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)	7 truckloads	
1.D	**Cost to Transport Waste In Drums (Multiply line 1.B by line 1.C)**		**$7,613**
2	**TRANSPORTATION OF BULK LIQUIDS**		
2.A	Gallons of liquid waste	gal	
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	truckloads	
2.D	**Cost to Transport Bulk Liquid Waste (Multiply line 2.B by line 2.C)**		**$**
3	**TRANSPORTATION OF BULK WASTE**		
3.A	Number of waste debris boxes	debris boxes	
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
3.C	**Cost to Transport Bulk Solid Waste (assume one debris box can be hauled on each truck) (Multiply line 3.A by line 3.B)**		**$**
	TOTAL COST TO TRANSPORT WASTE (Add lines 1.D, 2.D, and 3.C) (Enter total on Worksheet CS-1, line 7)		**$7,613**

Facility Name: CSA 30,000 Gallons

SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost **($)**
1.	Treatment and Disposal of Waste	CS-10A	
2.	Transportation and Disposal of Decontamination Fluids	CS-10B	$19,246
TOTAL COST OF TREATMENT AND DISPOSAL ***(Add lines 1 and 2)*** ***(Enter total on Worksheet CS-1, line 8)***			**$19,246**

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. _____ gal _____ gal _____ gal _____ gal _____ gal	17,573 total gal	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon)[c]	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	1 work hours	
6	Subtotal of labor and equipment cost to pump decontamination fluid to a holding tank (multiply line 3 by line 5)		$64
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	$ /day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	2 tanks	
10	Subtotal of tank rental costs (Multiply lines 7, 8, and 9)		$730
11	Removal cost per gallon of bulk liquid[d]	$ /gal	
12	Subtotal of removal cost for bulk liquids (Multiply line 1 by line 11)		$18,452
TOTAL COST TO TRANSPORT AND DISPOSE OF DECONTAMINATION FLUID AS A BULK LIQUID (Add lines 6, 10, and 12) (Enter total on Worksheet CS-10, line 2)			**$19,246**

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.

[c] Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

CONTAINER STORAGE AREAS CS-11

CERTIFICATION OF CLOSURE - Page 1 of 1

1	Number of units requiring certification of closure[a]	1	
2	Cost of certification of closure per unit[b]	$	
TOTAL COST OF CERTIFICATION OF CLOSURE (Multiply line 1 by line 2) (Enter total on Worksheet CS-1, line 11)			**$3,640**

Notes:

[a] Facilities closing multiple container storage areas in the same manner at the same time should incur cost of certification of closure only once.

[b] This cost includes the cost of performance of the following activities by a registered professional engineer: 1) reviewing the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A CSA CAPACITY 35,000 GALLONS

Facility Name: CSA 35,000 Gallons

SUMMARY WORKSHEET

	Activity **Some of the activities listed below are conducted routinely as part of closure. The owner or operator, however, might intend or be required to conduct certain additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type.**	Worksheet Number	Cost ($)
1.	Removal of Waste	CS-3	
2.	*Demolition and Removal of Containment System*	CS-4	
3.	*Removal of Soil*	CS-5	
4.	*Backfill*	CS-6	
5.	Decontamination	CS-7	$5,183
6.	Sampling and Analysis	CS-8	$10,325
7.	Transportation	CS-9	$8,700
8.	Treatment and Disposal	CS-10	$22,650
9.	**Subtotal of Closure Costs (Add lines 1 through 8)**		**$46,858**
10.	Engineering Expenses (approximately 10% of closure costs, excluding certification of closure) (Multiply line 9 by 0.10)		$4,686
11.	Certification of Closure	CS-11	$3,640
12.	**Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 9, 10, and 11)**		**$55,184**
13.	Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 12 by 0.20)		$11,037
	TOTAL COST OF CLOSURE (Add lines 12 and 13)		**$66,221**

CONTAINER STORAGE AREAS CS-2

The information entered on this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the costs of closure for container storage areas. If the design characteristics of the container storage area to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures and materials to be removed.[a] Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete each section of this inventory worksheet.

1 MAXIMUM PERMITTED CAPACITY

Determine the maximum permitted capacity of the container storage area to determine the cost of waste disposal.

1.A	**Volume of Waste**	**35,000**	**gal**

2 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure. Calculate the surface area of the secondary containment system pad to determine the costs of decontaminating and demolishing the pad.

2.A	Length (excluding any curbs or berm)	ft	
2.B	Width (excluding any curbs or berm)	ft	
2.C	**Surface Area of Containment System Pad (Multiply line 2.A by line 2.B)**	**5,067.1**	**ft^2**
2.D	**Surface Area of Containment System Pad in yd^2 (Divide line 2.C by 9)**	**563.0**	**yd^2**

3 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure. Calculate the volume of the secondary containment system pad to determine the cost of removal.

3.A	Thickness	ft	
3.B	Thickness in yards (Divide line 3.A by 3)	yd	
3.C	**Volume of Containment System Pad (Multiply line 2.D by line 3.B)**		**yd^3**

DECONTAMINATION SUMMARY WORKSHEET - Page 1 of 1

Facility Name: CSA 35,000 Gallons

DECONTAMINATION SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	CS-7A	$5,107
2.	Decontamination of Unit by Sandblasting	CS-7B	$
3.	Decontamination of Heavy Equipment	CS-7C	$76
TOTAL COST OF DECONTAMINATION (Add lines 1, 2, and 3) (Enter total on Worksheet CS-1, line 5)			**$5,183**

1	Area of unit to be decontaminated (Enter from Worksheet CS-2; add lines 2.C, 4.C, and 6.A)	5,067.1 ft^2	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to steam clean or pressure wash one ft^2[c]	work hrs/ft^2	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	137.0 work hrs	
6	Subtotal of labor and equipment costs to decontaminate the unit by steam cleaning or pressure washing (Multiply line 3 by line 5)		$5,107
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft^2)[d] (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	20,268 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)		$0
TOTAL COST OF DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING (For bulk liquids, enter from line 6. For liquids in drums, add lines 6 and 10.) (Enter total on Worksheet CS-7, line 1)			**$5,107**

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.

[c] Enter the estimated number of work hours required to steam clean or pressure wash one ft^2 of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft^2 of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] U.S. Environmental Protection Agency, *Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H)*, November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative rates may be used, as appropriate.

1	Number of hours needed to decontaminate all heavy equipment used during closure of the unit (Enter from Page 3 of 3 of this worksheet)	2 work hrs	
2	Cost of rental of steam cleaner per hour	$ /hr	
3	Subtotal steam cleaner rental costs (Multiply line 1 by line 2)		$12
4	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
5	Labor cost per work hour[b]	$	
6	Subtotal of labor costs (Multiply line 1 by line 5)		$64
7	Volume of decontamination fluid (Multiply line 1 by 100 gallons per hour) (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation, treatment, and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	200 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum and round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums (Multiply line 8 by line 9)		$0
11	Cost of construction of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**		$0

12	Cost of demolition of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**	$0
TOTAL COST OF DECONTAMINATION OF HEAVY EQUIPMENT (Add lines 3, 6, 10, 11, and 12) (Enter total on worksheet CS-7, line 3)		**$76**

Remember to calculate costs for transporting, treating, and disposing of all wastes in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor required to decontaminate heavy equipment.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: CSA 35,000 Gallons

SAMPLING AND ANALYSIS SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Drilling and Subsurface Soil Sampling & Analysis	CS-8B	$508
2.	Concrete Core Sampling & Analysis	CS-8C	$1,313
3.	Wipe Sampling & Analysis	CS-8D	$1,388
4.	Surface Water/Liquid Sampling & Analysis	CS-8E	$4,066
5.	Soil/Sludge/Sediment Sampling & Analysis	CS-8F	$3,050
TOTAL SAMPLING AND ANALYSIS COST (Add lines 1 through 5) (Enter total on Worksheet CS-1, line 6)			**$10,325**

The information entered on this inventory worksheet will be used in completing the appropriate cost estimating worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES

In the space below, identify the number of boreholes and the number of subsurface soil samples per borehole to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

1	**Number of Subsurface Soil Samples** **Boring Diameter:**	**boreholes**	**samples/borehole**	1	**total samples**

2 NUMBER OF CONCRETE CORE SAMPLES

In the space below, identify the number of concrete core samples to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

2	**Number of Concrete Core Samples**	3	**total samples**

3 NUMBER OF WIPE SAMPLES

In the space below, identify the number of sample locations and the number of wipe samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

3	**Number of Wipe Samples**	**locations**	**samples/location**	3	**total samples**

4 NUMBER OF SURFACE WATER/LIQUID SAMPLES

In the space below, identify the number of grab samples on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.

4	**Number of Aqueous Samples**	**locations**	**samples/location**	8	**total samples**

5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES

In the space below, identify the number of grab samples of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

5	**Number of Nonaqueous Samples**			
		locations	**samples/location**	6 **total samples**

Use this worksheet to estimate the cost of collecting samples of subsurface soil or rock. This worksheet assumes the use of a drill rig or other mechanical equipment to bore or core soil and rock by various drilling methods.

1	**COLLECTING SUBSURFACE SOIL SAMPLES - 2-1/2-INCH-DIAMETER BOREHOLE**		
1.A	Number of boreholes to be drilled (Enter from worksheet CS-8A, line 1)	1 boreholes	
1.B	Total depth of all boreholes (Add all depths. If the depths are not known, estimate the average depth of the boreholes to be drilled and multiply the estimated depth by line 1.A)	3.0 ft	
1.C	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
1.D	Labor and equipment cost per work hour[b]	$ /work hr	
1.E	Work rate to drill 2-1/2-inch-diameter hole[c]	work hr/ft	
1.F	Number of hours required to drill total depth of 2-1/2-inch-diameter holes (Multiply line 1.B by line 1.E) (One hour minimum; round up to the half-hour)	1.5 work hrs	
1.G	**Cost to Drill 2-1/2-inch Borings (Multiply line 1.D by line 1.F)**		**$91**
2	**COLLECTING SUBSURFACE SOIL SAMPLES - 4-INCH-DIAMETER BOREHOLE**		
2.A	Number of boreholes to be drilled (Enter from worksheet CS-8A, line 1)	boreholes	
2.B	Total depth of all boreholes (Add all depths. If the depths are not known, estimate the average depth of the boreholes to be drilled and multiply the estimated depth by line 2.A)	ft	
2.C	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
2.D	Labor and equipment cost per work hour[b]	$ /work hr	
2.E	Work rate to drill 4-inch-diameter hole[d]	work hr/ft	
2.F	Number of work hours required to drill total depth of 4-inch-diameter holes (Multiply line 2.B by line 2.E) (One hour minimum; round up to the half-hour)	work hrs	
2.G	**Cost to Drill 4-inch Borings (Multiply line 2.D by line 2.F)**		**$**

3	**ANALYZING SUBSURFACE SOIL SAMPLES**		
3.A	Determine the cost of analysis per sampling event for subsurface soil samples (Enter from Page 3 of 3 of this worksheet)	$139 /event	
3.B	Number of sampling events	3 events	
3.C	**Cost to Analyze Subsurface Soil Samples (Multiply line 3.A by line 3.B)**		**$417**
	TOTAL COST OF COLLECTION AND ANALYSIS OF SUBSURFACE SOIL SAMPLES (Add lines 1.G, 2.G, and 3.C) (Enter total on Worksheet CS-8, line 1)		**$508**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect boring and subsurface soil samples.

[c] Enter the estimated number of work hours per foot required to drill a 2½-inch-diameter hole and collect subsurface soil samples. If, for example, it is estimated that it will take 45 minutes per foot to drill a 2½-inch-diameter hole and collect a sample, enter a work rate of 0.750 (45 divided by 60) for conducting those activities. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all its sampling equipment. If an estimate of the total number of hours required to drill 2½-inch-diameter holes and collect subsurface soil samples has already been formulated, you may bypass this step and enter that number directly on line 1.F.

[d] Enter the estimated number of work hours per foot required to drill a 4-inch-diameter hole and collect subsurface soil samples. If, for example, it is estimated that it will take 45 minutes per foot to drill a 4-inch-diameter hole and collect a sample, enter a work rate of 0.750 (45 divided by 60) for drilling the hole. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to drill 4-inch holes and collect subsurface soil samples has already been formulated, you may bypass this step and enter that number directly on line 2.F.

Coring may be necessary to collect samples from hard surfaces, such as concrete.

1	**COLLECTING CONCRETE CORE SAMPLES**		
1.A	Number of concrete core samples to be collected (Enter from worksheet CS-8A, line 2)	3 core samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate to drill a 3-inch-diameter core sample boring to a depth of 6 inches[c]	work hr/sample	
1.E	Number of hours required to drill 3-inch-diameter borings (Multiply line 1.A by Line 1.D) (One hour minimum; round up to the half-hour)	1.5 work hrs	
1.F	**Cost to Collect Concrete Core Samples (Multiply line 1.C by line 1.E)**		**$62**
2	**ANALYZING CONCRETE CORE SAMPLES**		
2.A	Determine the cost of analysis per sampling event for concrete core samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Enter the number of sampling events	9 events	
2.C	**Cost to Analyze Concrete Core Samples (Multiply line 2.A by line 2.B)**		**$1,251**
	TOTAL COST OF COLLECTION AND ANALYSIS OF CONCRETE CORE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 2)		**$1,313**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect concrete core samples.

[c] Enter the estimated number of work hours required to drill one 3-inch-diameter core sample boring to a depth of 6 inches. If, for example, it is estimated that it will take 45 minutes to drill one 3-inch-diameter core sample boring, enter a work rate of 0.750 (45 divided by 60) for conducting that activity. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all its sampling equipment. If an estimate of the total number of hours required to drill 3-inch-diameter core sample borings has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1	**COLLECTING WIPE SAMPLES**		
1.A	Number of wipe samples to be collected (Enter from worksheet CS-8A, line 3)	3 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	1.5 work hrs	
1.F	**Cost to Collect Wipe Samples (Multiply line 1.C by line 1.E)**		**$137**
2	**ANALYZING WIPE SAMPLES**		
2.A	Cost of analysis per sampling event for wipe samples (Enter from page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	9 events	
2.C	**Cost to Analyze Wipe Samples (Multiply line 2.A by line 2.B)**		**$1,251**
	TOTAL COST OF COLLECTION AND ANALYSIS OF WIPE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 3)		**$1,388**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.

[c] Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Surface water/liquid samples are grab samples taken on lakes, rivers, or ponds or samples of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLLECTING SURFACE WATER/LIQUID SAMPLES			
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet CS-8A, line 4)	8 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]		
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	8.0 work hrs	
1.F	**Cost to Collect Surface Water/Liquid Samples (Multiply line 1.C by line 1.E)**		**$730**
2 ANALYZING SURFACE WATER/LIQUID SAMPLES			
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	24 events	
2.C	**Cost to Analyze Surface Water/Liquid Samples (Multiply line 2.A by line 2.B)**		**$3,336**
	TOTAL COST OF COLLECTION AND ANALYSIS OF AQUEOUS SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 4)		**$4,066**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect aqueous samples.

[c] Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Soil/sludge/sediment samples are grab samples of surface soil, sludge, sediment, or concrete chips. Such samples are shallow samples, that is, they are typically collected at depths of less than 1.5 feet below the ground surface.

1	**COLLECTING SOIL/SLUDGE/SEDIMENT SAMPLES**		
1.A	Number of soil/sludge/sediment samples to be collected (Enter from worksheet CS-8A, line 5)	6 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	6.0 work hrs	
1.F	**Cost to Collect Soil/Sludge/Sediment Samples (Multiply line 1.C by line 1.E)**		**$548**
2	**ANALYZING SOIL/SLUDGE/SEDIMENT SAMPLES**		
2.A	Cost of analysis per sampling event for soil/sludge/sediment samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	18 events	
2.C	**Cost to Analyze Soil/Sludge/Sediment Samples (Multiply line 2.A by line 2.B)**		**$2,502**
	TOTAL COST OF COLLECTION AND ANALYSIS OF SOIL/SLUDGE/SEDIMENT SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 5)		**$3,050**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect soil/sludge/sediment samples.

[c] Enter the estimated number of work hours required to collect one soil/sludge/sediment sample. If, for example, it is estimated that it will take 10 minutes per sample to collect soil/sludge/sediment samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect soil/sludge/sediment samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Depending on the activities being conducted, it may not be necessary to complete all sections of this worksheet.

1	**TRANSPORTATION OF WASTE IN DRUMS**		
1.A	Number of drums of waste	637 drums	
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)	8 truckloads	
1.D	**Cost to Transport Waste In Drums (Multiply line 1.B by line 1.C)**		**$8,700**
2	**TRANSPORTATION OF BULK LIQUIDS**		
2.A	Gallons of liquid waste	gal	
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	truckloads	
2.D	**Cost to Transport Bulk Liquid Waste (Multiply line 2.B by line 2.C)**		**$**
3	**TRANSPORTATION OF BULK WASTE**		
3.A	Number of waste debris boxes	debris boxes	
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
3.C	**Cost to Transport Bulk Solid Waste (assume one debris box can be hauled on each truck) (Multiply line 3.A by line 3.B)**		**$**
	TOTAL COST TO TRANSPORT WASTE (Add lines 1.D, 2.D, and 3.C) (Enter total on Worksheet CS-1, line 7)		**$8,700**

Facility Name: CSA 35,000 Gallons

SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost **($)**
1.	Treatment and Disposal of Waste	CS-10A	
2.	Transportation and Disposal of Decontamination Fluids	CS-10B	$22,650
TOTAL COST OF TREATMENT AND DISPOSAL *(Add lines 1 and 2)* ***(Enter total on Worksheet CS-1, line 8)***			**$22,650**

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. _____ gal _____ gal _____ gal _____ gal _____ gal	20,468 total gal	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon)[c]	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	1 work hours	
6	Subtotal of labor and equipment cost to pump decontamination fluid to a holding tank (multiply line 3 by line 5)		$64
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	$ /day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	3 tanks	
10	Subtotal of tank rental costs (Multiply lines 7, 8, and 9)		$1,095
11	Removal cost per gallon of bulk liquid[d]	$ /gal	
12	Subtotal of removal cost for bulk liquids (Multiply line 1 by line 11)		$21,491
TOTAL COST TO TRANSPORT AND DISPOSE OF DECONTAMINATION FLUID AS A BULK LIQUID (Add lines 6, 10, and 12) (Enter total on Worksheet CS-10, line 2)			**$22,650**

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.

[c] Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

1	Number of units requiring certification of closure[a]	1	
2	Cost of certification of closure per unit[b]	$	
TOTAL COST OF CERTIFICATION OF CLOSURE (Multiply line 1 by line 2) (Enter total on Worksheet CS-1, line 11)			**$3,640**

Notes:

[a] Facilities closing multiple container storage areas in the same manner at the same time should incur cost of certification of closure only once.

[b] This cost includes the cost of performance of the following activities by a registered professional engineer: 1) reviewing the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A CSA CAPACITY 40,000 GALLONS

Facility Name: CSA 40,000 Gallons

SUMMARY WORKSHEET

	Activity **Some of the activities listed below are conducted routinely as part of closure. The owner or operator, however, might intend or be required to conduct certain additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type.**	Worksheet Number	Cost ($)
1.	Removal of Waste	CS-3	
2.	*Demolition and Removal of Containment System*	CS-4	
3.	*Removal of Soil*	CS-5	
4.	*Backfill*	CS-6	
5.	Decontamination	CS-7	$5,910
6.	Sampling and Analysis	CS-8	$11,805
7.	Transportation	CS-9	$10,875
8.	Treatment and Disposal	CS-10	$25,712
9.	**Subtotal of Closure Costs (Add lines 1 through 8)**		**$54,302**
10.	Engineering Expenses (approximately 10% of closure costs, excluding certification of closure) (Multiply line 9 by 0.10)		$5,430
11.	Certification of Closure	CS-11	$3,640
12.	**Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 9, 10, and 11)**		**$63,372**
13.	Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 12 by 0.20)		$12,674
TOTAL COST OF CLOSURE (Add lines 12 and 13)			**$76,046**

CONTAINER STORAGE AREAS CS-2

The information entered on this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the costs of closure for container storage areas. If the design characteristics of the container storage area to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures and materials to be removed.[a] Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete each section of this inventory worksheet.

1 MAXIMUM PERMITTED CAPACITY

Determine the maximum permitted capacity of the container storage area to determine the cost of waste disposal.

1.A	**Volume of Waste**	**40,000**	**gal**

2 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure. Calculate the surface area of the secondary containment system pad to determine the costs of decontaminating and demolishing the pad.

2.A	Length (excluding any curbs or berm)	ft	
2.B	Width (excluding any curbs or berm)	ft	
2.C	**Surface Area of Containment System Pad (Multiply line 2.A by line 2.B)**	**5,790.9**	**ft^2**
2.D	**Surface Area of Containment System Pad in yd^2 (Divide line 2.C by 9)**	**643.4**	**yd^2**

3 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure. Calculate the volume of the secondary containment system pad to determine the cost of removal.

3.A	Thickness	ft	
3.B	Thickness in yards (Divide line 3.A by 3)	yd	
3.C	**Volume of Containment System Pad (Multiply line 2.D by line 3.B)**		**yd^3**

DECONTAMINATION SUMMARY WORKSHEET - Page 1 of 1

Facility Name: CSA 40,000 Gallons

DECONTAMINATION SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	CS-7A	$5,834
2.	Decontamination of Unit by Sandblasting	CS-7B	$
3.	Decontamination of Heavy Equipment	CS-7C	$76
TOTAL COST OF DECONTAMINATION (Add lines 1, 2, and 3) (Enter total on Worksheet CS-1, line 5)			**$5,910**

1	Area of unit to be decontaminated (Enter from Worksheet CS-2; add lines 2.C, 4.C, and 6.A)	5,790.9 ft^2	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to steam clean or pressure wash one ft^2[c]	work hrs/ft^2	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	156.5 work hrs	
6	Subtotal of labor and equipment costs to decontaminate the unit by steam cleaning or pressure washing (Multiply line 3 by line 5)		$5,834
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft^2)[d] (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	23,164 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)		$0
TOTAL COST OF DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING (For bulk liquids, enter from line 6. For liquids in drums, add lines 6 and 10.) (Enter total on Worksheet CS-7, line 1)			**$5,834**

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.

[c] Enter the estimated number of work hours required to steam clean or pressure wash one ft^2 of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft^2 of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] U.S. Environmental Protection Agency, *Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H)*, November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative rates may be used, as appropriate.

1	Number of hours needed to decontaminate all heavy equipment used during closure of the unit (Enter from Page 3 of 3 of this worksheet)	2 work hrs	
2	Cost of rental of steam cleaner per hour	$ /hr	
3	Subtotal steam cleaner rental costs (Multiply line 1 by line 2)		$12
4	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
5	Labor cost per work hour[b]	$	
6	Subtotal of labor costs (Multiply line 1 by line 5)		$64
7	Volume of decontamination fluid (Multiply line 1 by 100 gallons per hour) (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation, treatment, and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	200 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum and round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums (Multiply line 8 by line 9)		$0
11	Cost of construction of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**		$0

12	Cost of demolition of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**	$0
TOTAL COST OF DECONTAMINATION OF HEAVY EQUIPMENT (Add lines 3, 6, 10, 11, and 12) (Enter total on worksheet CS-7, line 3)		**$76**

Remember to calculate costs for transporting, treating, and disposing of all wastes in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor required to decontaminate heavy equipment.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: CSA 40,000 Gallons

SAMPLING AND ANALYSIS SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Drilling and Subsurface Soil Sampling & Analysis	CS-8B	$508
2.	Concrete Core Sampling & Analysis	CS-8C	$1,313
3.	Wipe Sampling & Analysis	CS-8D	$1,851
4.	Surface Water/Liquid Sampling & Analysis	CS-8E	$4,575
5.	Soil/Sludge/Sediment Sampling & Analysis	CS-8F	$3,558
TOTAL SAMPLING AND ANALYSIS COST (Add lines 1 through 5) (Enter total on Worksheet CS-1, line 6)			**$11,805**

The information entered on this inventory worksheet will be used in completing the appropriate cost estimating worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES

In the space below, identify the number of boreholes and the number of subsurface soil samples per borehole to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

1	**Number of Subsurface Soil Samples** **Boring Diameter:**	**boreholes**	**samples/borehole**	1	**total samples**

2 NUMBER OF CONCRETE CORE SAMPLES

In the space below, identify the number of concrete core samples to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

2	**Number of Concrete Core Samples**	3	**total samples**

3 NUMBER OF WIPE SAMPLES

In the space below, identify the number of sample locations and the number of wipe samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

3	**Number of Wipe Samples**	**locations**	**samples/location**	4	**total samples**

4 NUMBER OF SURFACE WATER/LIQUID SAMPLES

In the space below, identify the number of grab samples on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.

4	**Number of Aqueous Samples**	**locations**	**samples/location**	9	**total samples**

5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES

In the space below, identify the number of grab samples of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

5	**Number of Nonaqueous Samples**			
		locations	**samples/location**	7 **total samples**

Use this worksheet to estimate the cost of collecting samples of subsurface soil or rock. This worksheet assumes the use of a drill rig or other mechanical equipment to bore or core soil and rock by various drilling methods.

1	**COLLECTING SUBSURFACE SOIL SAMPLES - 2-1/2-INCH-DIAMETER BOREHOLE**		
1.A	Number of boreholes to be drilled (Enter from worksheet CS-8A, line 1)	1 boreholes	
1.B	Total depth of all boreholes (Add all depths. If the depths are not known, estimate the average depth of the boreholes to be drilled and multiply the estimated depth by line 1.A)	3.0 ft	
1.C	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
1.D	Labor and equipment cost per work hour[b]	$ /work hr	
1.E	Work rate to drill 2-1/2-inch-diameter hole[c]	work hr/ft	
1.F	Number of hours required to drill total depth of 2-1/2-inch-diameter holes (Multiply line 1.B by line 1.E) (One hour minimum; round up to the half-hour)	1.5 work hrs	
1.G	**Cost to Drill 2-1/2-inch Borings (Multiply line 1.D by line 1.F)**		**$91**
2	**COLLECTING SUBSURFACE SOIL SAMPLES - 4-INCH-DIAMETER BOREHOLE**		
2.A	Number of boreholes to be drilled (Enter from worksheet CS-8A, line 1)	boreholes	
2.B	Total depth of all boreholes (Add all depths. If the depths are not known, estimate the average depth of the boreholes to be drilled and multiply the estimated depth by line 2.A)	ft	
2.C	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
2.D	Labor and equipment cost per work hour[b]	$ /work hr	
2.E	Work rate to drill 4-inch-diameter hole[d]	work hr/ft	
2.F	Number of work hours required to drill total depth of 4-inch-diameter holes (Multiply line 2.B by line 2.E) (One hour minimum; round up to the half-hour)	work hrs	
2.G	**Cost to Drill 4-inch Borings (Multiply line 2.D by line 2.F)**		**$**

3	**ANALYZING SUBSURFACE SOIL SAMPLES**			
3.A	Determine the cost of analysis per sampling event for subsurface soil samples (Enter from Page 3 of 3 of this worksheet)	$139	/event	
3.B	Number of sampling events	3	events	
3.C	**Cost to Analyze Subsurface Soil Samples (Multiply line 3.A by line 3.B)**			**$417**
	TOTAL COST OF COLLECTION AND ANALYSIS OF SUBSURFACE SOIL SAMPLES (Add lines 1.G, 2.G, and 3.C) (Enter total on Worksheet CS-8, line 1)			**$508**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect boring and subsurface soil samples.

[c] Enter the estimated number of work hours per foot required to drill a 2½-inch-diameter hole and collect subsurface soil samples. If, for example, it is estimated that it will take 45 minutes per foot to drill a 2½-inch-diameter hole and collect a sample, enter a work rate of 0.750 (45 divided by 60) for conducting those activities. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all its sampling equipment. If an estimate of the total number of hours required to drill 2½-inch-diameter holes and collect subsurface soil samples has already been formulated, you may bypass this step and enter that number directly on line 1.F.

[d] Enter the estimated number of work hours per foot required to drill a 4-inch-diameter hole and collect subsurface soil samples. If, for example, it is estimated that it will take 45 minutes per foot to drill a 4-inch-diameter hole and collect a sample, enter a work rate of 0.750 (45 divided by 60) for drilling the hole. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to drill 4-inch holes and collect subsurface soil samples has already been formulated, you may bypass this step and enter that number directly on line 2.F.

Coring may be necessary to collect samples from hard surfaces, such as concrete.

1	**COLLECTING CONCRETE CORE SAMPLES**		
1.A	Number of concrete core samples to be collected (Enter from worksheet CS-8A, line 2)	3 core samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate to drill a 3-inch-diameter core sample boring to a depth of 6 inches[c]	work hr/sample	
1.E	Number of hours required to drill 3-inch-diameter borings (Multiply line 1.A by Line 1.D) (One hour minimum; round up to the half-hour)	1.5 work hrs	
1.F	**Cost to Collect Concrete Core Samples (Multiply line 1.C by line 1.E)**		**$62**
2	**ANALYZING CONCRETE CORE SAMPLES**		
2.A	Determine the cost of analysis per sampling event for concrete core samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Enter the number of sampling events	9 events	
2.C	**Cost to Analyze Concrete Core Samples (Multiply line 2.A by line 2.B)**		**$1,251**
	TOTAL COST OF COLLECTION AND ANALYSIS OF CONCRETE CORE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 2)		**$1,313**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect concrete core samples.

[c] Enter the estimated number of work hours required to drill one 3-inch-diameter core sample boring to a depth of 6 inches. If, for example, it is estimated that it will take 45 minutes to drill one 3-inch-diameter core sample boring, enter a work rate of 0.750 (45 divided by 60) for conducting that activity. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all its sampling equipment. If an estimate of the total number of hours required to drill 3-inch-diameter core sample borings has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1	**COLLECTING WIPE SAMPLES**		
1.A	Number of wipe samples to be collected (Enter from worksheet CS-8A, line 3)	4 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	2.0 work hrs	
1.F	**Cost to Collect Wipe Samples (Multiply line 1.C by line 1.E)**		**$183**
2	**ANALYZING WIPE SAMPLES**		
2.A	Cost of analysis per sampling event for wipe samples (Enter from page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	12 events	
2.C	**Cost to Analyze Wipe Samples (Multiply line 2.A by line 2.B)**		**$1,668**
	TOTAL COST OF COLLECTION AND ANALYSIS OF WIPE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 3)		**$1,851**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.

[c] Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Surface water/liquid samples are grab samples taken on lakes, rivers, or ponds or samples of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLLECTING SURFACE WATER/LIQUID SAMPLES			
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet CS-8A, line 4)	9 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]		
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	9.0 work hrs	
1.F	**Cost to Collect Surface Water/Liquid Samples (Multiply line 1.C by line 1.E)**		**$822**
2 ANALYZING SURFACE WATER/LIQUID SAMPLES			
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	27 events	
2.C	**Cost to Analyze Surface Water/Liquid Samples (Multiply line 2.A by line 2.B)**		**$3,753**
	TOTAL COST OF COLLECTION AND ANALYSIS OF AQUEOUS SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 4)		**$4,575**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect aqueous samples.

[c] Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Soil/sludge/sediment samples are grab samples of surface soil, sludge, sediment, or concrete chips. Such samples are shallow samples, that is, they are typically collected at depths of less than 1.5 feet below the ground surface.

1	**COLLECTING SOIL/SLUDGE/SEDIMENT SAMPLES**		
1.A	Number of soil/sludge/sediment samples to be collected (Enter from worksheet CS-8A, line 5)	7 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	7.0 work hrs	
1.F	**Cost to Collect Soil/Sludge/Sediment Samples (Multiply line 1.C by line 1.E)**		**$639**
2	**ANALYZING SOIL/SLUDGE/SEDIMENT SAMPLES**		
2.A	Cost of analysis per sampling event for soil/sludge/sediment samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	21 events	
2.C	**Cost to Analyze Soil/Sludge/Sediment Samples (Multiply line 2.A by line 2.B)**		**$2,919**
	TOTAL COST OF COLLECTION AND ANALYSIS OF SOIL/SLUDGE/SEDIMENT SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 5)		**$3,558**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect soil/sludge/sediment samples.

[c] Enter the estimated number of work hours required to collect one soil/sludge/sediment sample. If, for example, it is estimated that it will take 10 minutes per sample to collect soil/sludge/sediment samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect soil/sludge/sediment samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Depending on the activities being conducted, it may not be necessary to complete all sections of this worksheet.

1	**TRANSPORTATION OF WASTE IN DRUMS**		
1.A	Number of drums of waste	728 drums	
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)	10 truckloads	
1.D	**Cost to Transport Waste In Drums (Multiply line 1.B by line 1.C)**		**$10,875**
2	**TRANSPORTATION OF BULK LIQUIDS**		
2.A	Gallons of liquid waste	gal	
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	truckloads	
2.D	**Cost to Transport Bulk Liquid Waste (Multiply line 2.B by line 2.C)**		**$**
3	**TRANSPORTATION OF BULK WASTE**		
3.A	Number of waste debris boxes	debris boxes	
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
3.C	**Cost to Transport Bulk Solid Waste (assume one debris box can be hauled on each truck) (Multiply line 3.A by line 3.B)**		**$**
	TOTAL COST TO TRANSPORT WASTE (Add lines 1.D, 2.D, and 3.C) (Enter total on Worksheet CS-1, line 7)		**$10,875**

Facility Name: CSA 40,000 Gallons

SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost **($)**
1.	Treatment and Disposal of Waste	CS-10A	
2.	Transportation and Disposal of Decontamination Fluids	CS-10B	$25,712
TOTAL COST OF TREATMENT AND DISPOSAL *(Add lines 1 and 2)* ***(Enter total on Worksheet CS-1, line 8)***			**$25,712**

CONTAINER STORAGE AREAS CS-10B

TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS- Page 1 of 2

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. _____ gal _____ gal _____ gal _____ gal _____ gal	23,364 total gal	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon)[c]	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	2 work hours	
6	Subtotal of labor and equipment cost to pump decontamination fluid to a holding tank (multiply line 3 by line 5)		$85
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	$ /day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	3 tanks	
10	Subtotal of tank rental costs (Multiply lines 7, 8, and 9)		$1,095
11	Removal cost per gallon of bulk liquid[d]	$ /gal	
12	Subtotal of removal cost for bulk liquids (Multiply line 1 by line 11)		$24,532
TOTAL COST TO TRANSPORT AND DISPOSE OF DECONTAMINATION FLUID AS A BULK LIQUID (Add lines 6, 10, and 12) (Enter total on Worksheet CS-10, line 2)			**$25,712**

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.

[c] Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

CONTAINER STORAGE AREAS CS-11

CERTIFICATION OF CLOSURE - Page 1 of 1

1	Number of units requiring certification of closure[a]	1	
2	Cost of certification of closure per unit[b]	$	
TOTAL COST OF CERTIFICATION OF CLOSURE (Multiply line 1 by line 2) (Enter total on Worksheet CS-1, line 11)			**$3,640**

Notes:

[a] Facilities closing multiple container storage areas in the same manner at the same time should incur cost of certification of closure only once.

[b] This cost includes the cost of performance of the following activities by a registered professional engineer: 1) reviewing the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A CSA CAPACITY 45,000 GALLONS

Facility Name: CSA 45,000 Gallons

SUMMARY WORKSHEET

	Activity **Some of the activities listed below are conducted routinely as part of closure. The owner or operator, however, might intend or be required to conduct certain additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type.**	Worksheet Number	Cost ($)
1.	Removal of Waste	CS-3	
2.	*Demolition and Removal of Containment System*	CS-4	
3.	*Removal of Soil*	CS-5	
4.	*Backfill*	CS-6	
5.	Decontamination	CS-7	$6,637
6.	Sampling and Analysis	CS-8	$13,283
7.	Transportation	CS-9	$11,963
8.	Treatment and Disposal	CS-10	$28,752
9.	**Subtotal of Closure Costs (Add lines 1 through 8)**		**$60,635**
10.	Engineering Expenses (approximately 10% of closure costs, excluding certification of closure) (Multiply line 9 by 0.10)		$6,064
11.	Certification of Closure	CS-11	$3,640
12.	**Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 9, 10, and 11)**		**$70,339**
13.	Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 12 by 0.20)		$14,068
	TOTAL COST OF CLOSURE (Add lines 12 and 13)		**$84,407**

CONTAINER STORAGE AREAS CS-2

The information entered on this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the costs of closure for container storage areas. If the design characteristics of the container storage area to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures and materials to be removed.[a] Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete each section of this inventory worksheet.

1 MAXIMUM PERMITTED CAPACITY

Determine the maximum permitted capacity of the container storage area to determine the cost of waste disposal.

1.A	**Volume of Waste**	**45,000**	**gal**

2 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure. Calculate the surface area of the secondary containment system pad to determine the costs of decontaminating and demolishing the pad.

2.A	Length (excluding any curbs or berm)	ft	
2.B	Width (excluding any curbs or berm)	ft	
2.C	**Surface Area of Containment System Pad (Multiply line 2.A by line 2.B)**	**6,514.8**	**ft^2**
2.D	**Surface Area of Containment System Pad in yd^2 (Divide line 2.C by 9)**	**723.9**	**yd^2**

3 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure. Calculate the volume of the secondary containment system pad to determine the cost of removal.

3.A	Thickness	ft	
3.B	Thickness in yards (Divide line 3.A by 3)	yd	
3.C	**Volume of Containment System Pad (Multiply line 2.D by line 3.B)**		**yd^3**

DECONTAMINATION SUMMARY WORKSHEET - Page 1 of 1

Facility Name: CSA 45,000 Gallons

DECONTAMINATION SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	CS-7A	$6,561
2.	Decontamination of Unit by Sandblasting	CS-7B	$
3.	Decontamination of Heavy Equipment	CS-7C	$76
TOTAL COST OF DECONTAMINATION (Add lines 1, 2, and 3) (Enter total on Worksheet CS-1, line 5)			**$6,637**

1	Area of unit to be decontaminated (Enter from Worksheet CS-2; add lines 2.C, 4.C, and 6.A)	6,514.8 ft^2	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to steam clean or pressure wash one ft^2[c]	work hrs/ft^2	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	176.0 work hrs	
6	Subtotal of labor and equipment costs to decontaminate the unit by steam cleaning or pressure washing (Multiply line 3 by line 5)		$6,561
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft^2)[d] (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	26,059 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)		$0
TOTAL COST OF DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING (For bulk liquids, enter from line 6. For liquids in drums, add lines 6 and 10.) (Enter total on Worksheet CS-7, line 1)			**$6,561**

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.

[c] Enter the estimated number of work hours required to steam clean or pressure wash one ft^2 of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft^2 of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] U.S. Environmental Protection Agency, *Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H)*, November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative rates may be used, as appropriate.

1	Number of hours needed to decontaminate all heavy equipment used during closure of the unit (Enter from Page 3 of 3 of this worksheet)	2 work hrs	
2	Cost of rental of steam cleaner per hour	$ /hr	
3	Subtotal steam cleaner rental costs (Multiply line 1 by line 2)		$12
4	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
5	Labor cost per work hour[b]	$	
6	Subtotal of labor costs (Multiply line 1 by line 5)		$64
7	Volume of decontamination fluid (Multiply line 1 by 100 gallons per hour) (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation, treatment, and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	200 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum and round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums (Multiply line 8 by line 9)		$0
11	Cost of construction of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**		$0

12	Cost of demolition of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**	$0
TOTAL COST OF DECONTAMINATION OF HEAVY EQUIPMENT (Add lines 3, 6, 10, 11, and 12) (Enter total on worksheet CS-7, line 3)		**$76**

Remember to calculate costs for transporting, treating, and disposing of all wastes in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor required to decontaminate heavy equipment.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: CSA 45,000 Gallons

SAMPLING AND ANALYSIS SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Drilling and Subsurface Soil Sampling & Analysis	CS-8B	$508
2.	Concrete Core Sampling & Analysis	CS-8C	$1,313
3.	Wipe Sampling & Analysis	CS-8D	$2,313
4.	Surface Water/Liquid Sampling & Analysis	CS-8E	$5,083
5.	Soil/Sludge/Sediment Sampling & Analysis	CS-8F	$4,066
TOTAL SAMPLING AND ANALYSIS COST (Add lines 1 through 5) (Enter total on Worksheet CS-1, line 6)			**$13,283**

The information entered on this inventory worksheet will be used in completing the appropriate cost estimating worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES

In the space below, identify the number of boreholes and the number of subsurface soil samples per borehole to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

1	**Number of Subsurface Soil Samples** **Boring Diameter:**				
		boreholes	**samples/borehole**	1	**total samples**

2 NUMBER OF CONCRETE CORE SAMPLES

In the space below, identify the number of concrete core samples to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

2	**Number of Concrete Core Samples**	3	**total samples**

3 NUMBER OF WIPE SAMPLES

In the space below, identify the number of sample locations and the number of wipe samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

3	**Number of Wipe Samples**				
		locations	**samples/location**	5	**total samples**

4 NUMBER OF SURFACE WATER/LIQUID SAMPLES

In the space below, identify the number of grab samples on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.

4	**Number of Aqueous Samples**				
		locations	**samples/location**	10	**total samples**

5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES

In the space below, identify the number of grab samples of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

5	**Number of Nonaqueous Samples**				
		locations	**samples/location**	8	**total samples**

Use this worksheet to estimate the cost of collecting samples of subsurface soil or rock. This worksheet assumes the use of a drill rig or other mechanical equipment to bore or core soil and rock by various drilling methods.

1	**COLLECTING SUBSURFACE SOIL SAMPLES - 2-1/2-INCH-DIAMETER BOREHOLE**		
1.A	Number of boreholes to be drilled (Enter from worksheet CS-8A, line 1)	1 boreholes	
1.B	Total depth of all boreholes (Add all depths. If the depths are not known, estimate the average depth of the boreholes to be drilled and multiply the estimated depth by line 1.A)	3.0 ft	
1.C	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
1.D	Labor and equipment cost per work hour[b]	$ /work hr	
1.E	Work rate to drill 2-1/2-inch-diameter hole[c]	work hr/ft	
1.F	Number of hours required to drill total depth of 2-1/2-inch-diameter holes (Multiply line 1.B by line 1.E) (One hour minimum; round up to the half-hour)	1.5 work hrs	
1.G	**Cost to Drill 2-1/2-inch Borings (Multiply line 1.D by line 1.F)**		**$91**
2	**COLLECTING SUBSURFACE SOIL SAMPLES - 4-INCH-DIAMETER BOREHOLE**		
2.A	Number of boreholes to be drilled (Enter from worksheet CS-8A, line 1)	boreholes	
2.B	Total depth of all boreholes (Add all depths. If the depths are not known, estimate the average depth of the boreholes to be drilled and multiply the estimated depth by line 2.A)	ft	
2.C	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
2.D	Labor and equipment cost per work hour[b]	$ /work hr	
2.E	Work rate to drill 4-inch-diameter hole[d]	work hr/ft	
2.F	Number of work hours required to drill total depth of 4-inch-diameter holes (Multiply line 2.B by line 2.E) (One hour minimum; round up to the half-hour)	work hrs	
2.G	**Cost to Drill 4-inch Borings (Multiply line 2.D by line 2.F)**		**$**

3	**ANALYZING SUBSURFACE SOIL SAMPLES**		
3.A	Determine the cost of analysis per sampling event for subsurface soil samples (Enter from Page 3 of 3 of this worksheet)	$139 /event	
3.B	Number of sampling events	3 events	
3.C	**Cost to Analyze Subsurface Soil Samples (Multiply line 3.A by line 3.B)**		**$417**
	TOTAL COST OF COLLECTION AND ANALYSIS OF SUBSURFACE SOIL SAMPLES (Add lines 1.G, 2.G, and 3.C) (Enter total on Worksheet CS-8, line 1)		**$508**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect boring and subsurface soil samples.

[c] Enter the estimated number of work hours per foot required to drill a 2½-inch-diameter hole and collect subsurface soil samples. If, for example, it is estimated that it will take 45 minutes per foot to drill a 2½-inch-diameter hole and collect a sample, enter a work rate of 0.750 (45 divided by 60) for conducting those activities. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all its sampling equipment. If an estimate of the total number of hours required to drill 2½-inch-diameter holes and collect subsurface soil samples has already been formulated, you may bypass this step and enter that number directly on line 1.F.

[d] Enter the estimated number of work hours per foot required to drill a 4-inch-diameter hole and collect subsurface soil samples. If, for example, it is estimated that it will take 45 minutes per foot to drill a 4-inch-diameter hole and collect a sample, enter a work rate of 0.750 (45 divided by 60) for drilling the hole. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to drill 4-inch holes and collect subsurface soil samples has already been formulated, you may bypass this step and enter that number directly on line 2.F.

Coring may be necessary to collect samples from hard surfaces, such as concrete.

1	**COLLECTING CONCRETE CORE SAMPLES**		
1.A	Number of concrete core samples to be collected (Enter from worksheet CS-8A, line 2)	3 core samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate to drill a 3-inch-diameter core sample boring to a depth of 6 inches[c]	work hr/sample	
1.E	Number of hours required to drill 3-inch-diameter borings (Multiply line 1.A by Line 1.D) (One hour minimum; round up to the half-hour)	1.5 work hrs	
1.F	**Cost to Collect Concrete Core Samples (Multiply line 1.C by line 1.E)**		**$62**
2	**ANALYZING CONCRETE CORE SAMPLES**		
2.A	Determine the cost of analysis per sampling event for concrete core samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Enter the number of sampling events	9 events	
2.C	**Cost to Analyze Concrete Core Samples (Multiply line 2.A by line 2.B)**		**$1,251**
	TOTAL COST OF COLLECTION AND ANALYSIS OF CONCRETE CORE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 2)		**$1,313**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect concrete core samples.

[c] Enter the estimated number of work hours required to drill one 3-inch-diameter core sample boring to a depth of 6 inches. If, for example, it is estimated that it will take 45 minutes to drill one 3-inch-diameter core sample boring, enter a work rate of 0.750 (45 divided by 60) for conducting that activity. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all its sampling equipment. If an estimate of the total number of hours required to drill 3-inch-diameter core sample borings has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1	**COLLECTING WIPE SAMPLES**		
1.A	Number of wipe samples to be collected (Enter from worksheet CS-8A, line 3)	5 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	2.5 work hrs	
1.F	**Cost to Collect Wipe Samples (Multiply line 1.C by line 1.E)**		**$228**
2	**ANALYZING WIPE SAMPLES**		
2.A	Cost of analysis per sampling event for wipe samples (Enter from page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	15 events	
2.C	**Cost to Analyze Wipe Samples (Multiply line 2.A by line 2.B)**		**$2,085**
	TOTAL COST OF COLLECTION AND ANALYSIS OF WIPE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 3)		**$2,313**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.

[c] Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Surface water/liquid samples are grab samples taken on lakes, rivers, or ponds or samples of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLLECTING SURFACE WATER/LIQUID SAMPLES			
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet CS-8A, line 4)	10 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]		
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	10.0 work hrs	
1.F	**Cost to Collect Surface Water/Liquid Samples (Multiply line 1.C by line 1.E)**		**$913**
2 ANALYZING SURFACE WATER/LIQUID SAMPLES			
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	30 events	
2.C	**Cost to Analyze Surface Water/Liquid Samples (Multiply line 2.A by line 2.B)**		**$4,170**
	TOTAL COST OF COLLECTION AND ANALYSIS OF AQUEOUS SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 4)		**$5,083**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect aqueous samples.

[c] Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Soil/sludge/sediment samples are grab samples of surface soil, sludge, sediment, or concrete chips. Such samples are shallow samples, that is, they are typically collected at depths of less than 1.5 feet below the ground surface.

1	**COLLECTING SOIL/SLUDGE/SEDIMENT SAMPLES**		
1.A	Number of soil/sludge/sediment samples to be collected (Enter from worksheet CS-8A, line 5)	8 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	8.0 work hrs	
1.F	**Cost to Collect Soil/Sludge/Sediment Samples (Multiply line 1.C by line 1.E)**		**$730**
2	**ANALYZING SOIL/SLUDGE/SEDIMENT SAMPLES**		
2.A	Cost of analysis per sampling event for soil/sludge/sediment samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	24 events	
2.C	**Cost to Analyze Soil/Sludge/Sediment Samples (Multiply line 2.A by line 2.B)**		**$3,336**
	TOTAL COST OF COLLECTION AND ANALYSIS OF SOIL/SLUDGE/SEDIMENT SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 5)		**$4,066**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect soil/sludge/sediment samples.

[c] Enter the estimated number of work hours required to collect one soil/sludge/sediment sample. If, for example, it is estimated that it will take 10 minutes per sample to collect soil/sludge/sediment samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect soil/sludge/sediment samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Depending on the activities being conducted, it may not be necessary to complete all sections of this worksheet.

1	**TRANSPORTATION OF WASTE IN DRUMS**		
1.A	Number of drums of waste	819 drums	
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)	11 truckloads	
1.D	**Cost to Transport Waste In Drums (Multiply line 1.B by line 1.C)**		**$11,963**
2	**TRANSPORTATION OF BULK LIQUIDS**		
2.A	Gallons of liquid waste	gal	
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	truckloads	
2.D	**Cost to Transport Bulk Liquid Waste (Multiply line 2.B by line 2.C)**		**$**
3	**TRANSPORTATION OF BULK WASTE**		
3.A	Number of waste debris boxes	debris boxes	
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
3.C	**Cost to Transport Bulk Solid Waste (assume one debris box can be hauled on each truck) (Multiply line 3.A by line 3.B)**		**$**
	TOTAL COST TO TRANSPORT WASTE (Add lines 1.D, 2.D, and 3.C) (Enter total on Worksheet CS-1, line 7)		**$11,963**

Facility Name: CSA 45,000 Gallons

SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost **($)**
1.	Treatment and Disposal of Waste	CS-10A	
2.	Transportation and Disposal of Decontamination Fluids	CS-10B	$28,752
TOTAL COST OF TREATMENT AND DISPOSAL ***(Add lines 1 and 2)*** ***(Enter total on Worksheet CS-1, line 8)***			**$28,752**

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. _____ gal _____ gal _____ gal _____ gal _____ gal	26,259 total gal	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon)[c]	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	2 work hours	
6	Subtotal of labor and equipment cost to pump decontamination fluid to a holding tank (multiply line 3 by line 5)		$85
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	$ /day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	3 tanks	
10	Subtotal of tank rental costs (Multiply lines 7, 8, and 9)		$1,095
11	Removal cost per gallon of bulk liquid[d]	$ /gal	
12	Subtotal of removal cost for bulk liquids (Multiply line 1 by line 11)		$27,572
TOTAL COST TO TRANSPORT AND DISPOSE OF DECONTAMINATION FLUID AS A BULK LIQUID (Add lines 6, 10, and 12) (Enter total on Worksheet CS-10, line 2)			**$28,752**

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.

[c] Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

CONTAINER STORAGE AREAS CS-11

CERTIFICATION OF CLOSURE - Page 1 of 1

1	Number of units requiring certification of closure[a]	1	
2	Cost of certification of closure per unit[b]	$	
TOTAL COST OF CERTIFICATION OF CLOSURE (Multiply line 1 by line 2) (Enter total on Worksheet CS-1, line 11)			**$3,640**

Notes:

[a] Facilities closing multiple container storage areas in the same manner at the same time should incur cost of certification of closure only once.

[b] This cost includes the cost of performance of the following activities by a registered professional engineer: 1) reviewing the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

COST ESTIMATING WORKSHEETS FOR CLOSURE OF A CSA CAPACITY 50,000 GALLONS

Facility Name: CSA 50,000 Gallons

SUMMARY WORKSHEET

	Activity **Some of the activities listed below are conducted routinely as part of closure. The owner or operator, however, might intend or be required to conduct certain additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type.**	Worksheet Number	Cost ($)
1.	Removal of Waste	CS-3	
2.	*Demolition and Removal of Containment System*	CS-4	
3.	*Removal of Soil*	CS-5	
4.	*Backfill*	CS-6	
5.	Decontamination	CS-7	$7,402
6.	Sampling and Analysis	CS-8	$14,737
7.	Transportation	CS-9	$13,050
8.	Treatment and Disposal	CS-10	$31,920
9.	**Subtotal of Closure Costs (Add lines 1 through 8)**		**$67,109**
10.	Engineering Expenses (approximately 10% of closure costs, excluding certification of closure) (Multiply line 9 by 0.10)		$6,711
11.	Certification of Closure	CS-11	$3,640
12.	**Subtotal (Add engineering expenses and cost of certification of closure to closure costs) (Add lines 9, 10, and 11)**		**$77,460**
13.	Contingency Allowance (approximately 20% of closure costs, engineering expenses, and cost of certification of closure) (Multiply line 12 by 0.20)		$15,492
	TOTAL COST OF CLOSURE (Add lines 12 and 13)		**$92,952**

CONTAINER STORAGE AREAS CS-2

The information entered on this inventory worksheet will be used to complete those worksheets that are appropriate for estimating the costs of closure for container storage areas. If the design characteristics of the container storage area to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures and materials to be removed.[a] Depending on the activities to be conducted to effect closure at the unit, it may not be necessary to complete each section of this inventory worksheet.

1 MAXIMUM PERMITTED CAPACITY

Determine the maximum permitted capacity of the container storage area to determine the cost of waste disposal.

1.A	**Volume of Waste**	**50,000**	**gal**

2 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD

Demolition of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to demolish the pad at the time of closure. Calculate the surface area of the secondary containment system pad to determine the costs of decontaminating and demolishing the pad.

2.A	Length (excluding any curbs or berm)	ft	
2.B	Width (excluding any curbs or berm)	ft	
2.C	**Surface Area of Containment System Pad (Multiply line 2.A by line 2.B)**	**7,238.7**	**ft^2**
2.D	**Surface Area of Containment System Pad in yd^2 (Divide line 2.C by 9)**	**804.3**	**yd^2**

3 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD

Removal of the secondary containment system pad is an additional activity that might be conducted if the owner or operator intends to remove the pad at the time of closure. Calculate the volume of the secondary containment system pad to determine the cost of removal.

3.A	Thickness	ft	
3.B	Thickness in yards (Divide line 3.A by 3)	yd	
3.C	**Volume of Containment System Pad (Multiply line 2.D by line 3.B)**		**yd^3**

DECONTAMINATION SUMMARY WORKSHEET - Page 1 of 1

Facility Name: CSA 50,000 Gallons

DECONTAMINATION SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Decontamination of Unit by Steam Cleaning or Pressure Washing	CS-7A	$7,288
2.	Decontamination of Unit by Sandblasting	CS-7B	$
3.	Decontamination of Heavy Equipment	CS-7C	$114
TOTAL COST OF DECONTAMINATION (Add lines 1, 2, and 3) (Enter total on Worksheet CS-1, line 5)			**$7,402**

1	Area of unit to be decontaminated (Enter from Worksheet CS-2; add lines 2.C, 4.C, and 6.A)	7,238.7 ft^2	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to steam clean or pressure wash one ft^2[c]	work hrs/ft^2	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	195.5 work hrs	
6	Subtotal of labor and equipment costs to decontaminate the unit by steam cleaning or pressure washing (Multiply line 3 by line 5)		$7,288
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft^2)[d] (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	28,955 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)		$0
TOTAL COST OF DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING (For bulk liquids, enter from line 6. For liquids in drums, add lines 6 and 10.) (Enter total on Worksheet CS-7, line 1)			**$7,288**

Remember to calculate costs for transporting, treating, and disposing of all decontamination fluids in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING - Page 2 of 2

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.

[c] Enter the estimated number of work hours required to steam clean or pressure wash one ft^2 of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft^2 of surface area, enter a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit. If an estimate of the total number of hours required to decontaminate the unit has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] U.S. Environmental Protection Agency, *Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H)*, November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative rates may be used, as appropriate.

1	Number of hours needed to decontaminate all heavy equipment used during closure of the unit (Enter from Page 3 of 3 of this worksheet)	3 work hrs	
2	Cost of rental of steam cleaner per hour	$ /hr	
3	Subtotal steam cleaner rental costs (Multiply line 1 by line 2)		$18
4	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
5	Labor cost per work hour[b]	$	
6	Subtotal of labor costs (Multiply line 1 by line 5)		$96
7	Volume of decontamination fluid (Multiply line 1 by 100 gallons per hour) (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet CS-10B to calculate the cost of transportation, treatment, and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10.)	300 gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum and round up to the nearest whole number)	0 drums	
9	Cost of one drum	$ /drum	
10	Cost of drums (Multiply line 8 by line 9)		$0
11	Cost of construction of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**		$0

12	Cost of demolition of temporary decontamination area for heavy equipment (Include this cost if no permanent decontamination area exists) **NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS**	$0
TOTAL COST OF DECONTAMINATION OF HEAVY EQUIPMENT (Add lines 3, 6, 10, 11, and 12) (Enter total on worksheet CS-7, line 3)		**$114**

Remember to calculate costs for transporting, treating, and disposing of all wastes in drums that are generated from this activity, using worksheets CS-9 and CS-10A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet CS-10B.

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

[b] Enter the estimated cost per work hour of all labor required to decontaminate heavy equipment.

SAMPLING AND ANALYSIS SUMMARY SHEET - PAGE 1 of 1

Facility Name: CSA 50,000 Gallons

SAMPLING AND ANALYSIS SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Drilling and Subsurface Soil Sampling & Analysis	CS-8B	$508
2.	Concrete Core Sampling & Analysis	CS-8C	$1,750
3.	Wipe Sampling & Analysis	CS-8D	$2,313
4.	Surface Water/Liquid Sampling & Analysis	CS-8E	$5,591
5.	Soil/Sludge/Sediment Sampling & Analysis	CS-8F	$4,575
TOTAL SAMPLING AND ANALYSIS COST (Add lines 1 through 5) (Enter total on Worksheet CS-1, line 6)			**$14,737**

The information entered on this inventory worksheet will be used in completing the appropriate cost estimating worksheets to determine the cost of sampling and analysis during closure. Depending on the types of samples to be collected and analyzed, it may not be necessary to complete all sections of this inventory worksheet.

1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES

In the space below, identify the number of boreholes and the number of subsurface soil samples per borehole to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

1	**Number of Subsurface Soil Samples** **Boring Diameter:**	**boreholes**	**samples/borehole**	1	**total samples**

2 NUMBER OF CONCRETE CORE SAMPLES

In the space below, identify the number of concrete core samples to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

2	**Number of Concrete Core Samples**	4	**total samples**

3 NUMBER OF WIPE SAMPLES

In the space below, identify the number of sample locations and the number of wipe samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

3	**Number of Wipe Samples**	**locations**	**samples/location**	5	**total samples**

4 NUMBER OF SURFACE WATER/LIQUID SAMPLES

In the space below, identify the number of grab samples on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.

4	**Number of Aqueous Samples**	**locations**	**samples/location**	11	**total samples**

5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES

In the space below, identify the number of grab samples of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.

5	**Number of Nonaqueous Samples**				
		locations	**samples/location**	9	**total samples**

Use this worksheet to estimate the cost of collecting samples of subsurface soil or rock. This worksheet assumes the use of a drill rig or other mechanical equipment to bore or core soil and rock by various drilling methods.

1	**COLLECTING SUBSURFACE SOIL SAMPLES - 2-1/2-INCH-DIAMETER BOREHOLE**		
1.A	Number of boreholes to be drilled (Enter from worksheet CS-8A, line 1)	1 boreholes	
1.B	Total depth of all boreholes (Add all depths. If the depths are not known, estimate the average depth of the boreholes to be drilled and multiply the estimated depth by line 1.A)	3.0 ft	
1.C	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
1.D	Labor and equipment cost per work hour[b]	$ /work hr	
1.E	Work rate to drill 2-1/2-inch-diameter hole[c]	work hr/ft	
1.F	Number of hours required to drill total depth of 2-1/2-inch-diameter holes (Multiply line 1.B by line 1.E) (One hour minimum; round up to the half-hour)	1.5 work hrs	
1.G	**Cost to Drill 2-1/2-inch Borings (Multiply line 1.D by line 1.F)**		**$91**
2	**COLLECTING SUBSURFACE SOIL SAMPLES - 4-INCH-DIAMETER BOREHOLE**		
2.A	Number of boreholes to be drilled (Enter from worksheet CS-8A, line 1)	boreholes	
2.B	Total depth of all boreholes (Add all depths. If the depths are not known, estimate the average depth of the boreholes to be drilled and multiply the estimated depth by line 2.A)	ft	
2.C	Level of PPE assumed for this activity (protection level D, C, or B)[a]	level of PPE	
2.D	Labor and equipment cost per work hour[b]	$ /work hr	
2.E	Work rate to drill 4-inch-diameter hole[d]	work hr/ft	
2.F	Number of work hours required to drill total depth of 4-inch-diameter holes (Multiply line 2.B by line 2.E) (One hour minimum; round up to the half-hour)	work hrs	
2.G	**Cost to Drill 4-inch Borings (Multiply line 2.D by line 2.F)**		**$**

3	**ANALYZING SUBSURFACE SOIL SAMPLES**		
3.A	Determine the cost of analysis per sampling event for subsurface soil samples (Enter from Page 3 of 3 of this worksheet)	$139 /event	
3.B	Number of sampling events	3 events	
3.C	**Cost to Analyze Subsurface Soil Samples (Multiply line 3.A by line 3.B)**		**$417**
	TOTAL COST OF COLLECTION AND ANALYSIS OF SUBSURFACE SOIL SAMPLES (Add lines 1.G, 2.G, and 3.C) (Enter total on Worksheet CS-8, line 1)		**$508**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect boring and subsurface soil samples.

[c] Enter the estimated number of work hours per foot required to drill a 2½-inch-diameter hole and collect subsurface soil samples. If, for example, it is estimated that it will take 45 minutes per foot to drill a 2½-inch-diameter hole and collect a sample, enter a work rate of 0.750 (45 divided by 60) for conducting those activities. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all its sampling equipment. If an estimate of the total number of hours required to drill 2½-inch-diameter holes and collect subsurface soil samples has already been formulated, you may bypass this step and enter that number directly on line 1.F.

[d] Enter the estimated number of work hours per foot required to drill a 4-inch-diameter hole and collect subsurface soil samples. If, for example, it is estimated that it will take 45 minutes per foot to drill a 4-inch-diameter hole and collect a sample, enter a work rate of 0.750 (45 divided by 60) for drilling the hole. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to drill 4-inch holes and collect subsurface soil samples has already been formulated, you may bypass this step and enter that number directly on line 2.F.

Coring may be necessary to collect samples from hard surfaces, such as concrete.

1	**COLLECTING CONCRETE CORE SAMPLES**		
1.A	Number of concrete core samples to be collected (Enter from worksheet CS-8A, line 2)	4 core samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate to drill a 3-inch-diameter core sample boring to a depth of 6 inches[c]	work hr/sample	
1.E	Number of hours required to drill 3-inch-diameter borings (Multiply line 1.A by Line 1.D) (One hour minimum; round up to the half-hour)	2.0 work hrs	
1.F	**Cost to Collect Concrete Core Samples (Multiply line 1.C by line 1.E)**		**$82**
2	**ANALYZING CONCRETE CORE SAMPLES**		
2.A	Determine the cost of analysis per sampling event for concrete core samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Enter the number of sampling events	12 events	
2.C	**Cost to Analyze Concrete Core Samples (Multiply line 2.A by line 2.B)**		**$1,668**
	TOTAL COST OF COLLECTION AND ANALYSIS OF CONCRETE CORE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 2)		**$1,750**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect concrete core samples.

[c] Enter the estimated number of work hours required to drill one 3-inch-diameter core sample boring to a depth of 6 inches. If, for example, it is estimated that it will take 45 minutes to drill one 3-inch-diameter core sample boring, enter a work rate of 0.750 (45 divided by 60) for conducting that activity. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all its sampling equipment. If an estimate of the total number of hours required to drill 3-inch-diameter core sample borings has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Wipe samples often are used to assess the presence or extent of contamination on hard, relatively nonporous surfaces. In general, wipe sampling is used only when the contaminant of concern has a heavy, persistent characteristic, meaning it does not easily volatilize or leave the surface being sampled.

1	**COLLECTING WIPE SAMPLES**		
1.A	Number of wipe samples to be collected (Enter from worksheet CS-8A, line 3)	5 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	2.5 work hrs	
1.F	**Cost to Collect Wipe Samples (Multiply line 1.C by line 1.E)**		**$228**
2	**ANALYZING WIPE SAMPLES**		
2.A	Cost of analysis per sampling event for wipe samples (Enter from page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	15 events	
2.C	**Cost to Analyze Wipe Samples (Multiply line 2.A by line 2.B)**		**$2,085**
	TOTAL COST OF COLLECTION AND ANALYSIS OF WIPE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 3)		**$2,313**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect wipe samples.

[c] Enter the estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect wipe samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Surface water/liquid samples are grab samples taken on lakes, rivers, or ponds or samples of liquid wastes such as rinsate and wastewater. This worksheet is not to be used to estimate the cost of sampling and analyzing other aqueous media, such as groundwater.

1 COLLECTING SURFACE WATER/LIQUID SAMPLES			
1.A	Number of surface water/liquid samples to be collected (Enter from worksheet CS-8A, line 4)	11 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]		
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	11.0 work hrs	
1.F	**Cost to Collect Surface Water/Liquid Samples (Multiply line 1.C by line 1.E)**		**$1,004**
2 ANALYZING SURFACE WATER/LIQUID SAMPLES			
2.A	Cost of analysis per sampling event for surface water/liquid samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	33 events	
2.C	**Cost to Analyze Surface Water/Liquid Samples (Multiply line 2.A by line 2.B)**		**$4,587**
	TOTAL COST OF COLLECTION AND ANALYSIS OF AQUEOUS SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 4)		**$5,591**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect aqueous samples.

[c] Enter the estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect surface water/liquid samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Soil/sludge/sediment samples are grab samples of surface soil, sludge, sediment, or concrete chips. Such samples are shallow samples, that is, they are typically collected at depths of less than 1.5 feet below the ground surface.

1	**COLLECTING SOIL/SLUDGE/SEDIMENT SAMPLES**		
1.A	Number of soil/sludge/sediment samples to be collected (Enter from worksheet CS-8A, line 5)	9 samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D level of PPE	
1.C	Labor and equipment cost per work hour[b]	$	
1.D	Work rate required to collect one sample[c]	work hr/sample	
1.E	Number of hours required to collect all samples (Multiply line 1.A by line 1.D)	9.0 work hrs	
1.F	**Cost to Collect Soil/Sludge/Sediment Samples (Multiply line 1.C by line 1.E)**		**$822**
2	**ANALYZING SOIL/SLUDGE/SEDIMENT SAMPLES**		
2.A	Cost of analysis per sampling event for soil/sludge/sediment samples (Enter from Page 2 of 2 of this worksheet)	$139 /event	
2.B	Number of sampling events	27 events	
2.C	**Cost to Analyze Soil/Sludge/Sediment Samples (Multiply line 2.A by line 2.B)**		**$3,753**
	TOTAL COST OF COLLECTION AND ANALYSIS OF SOIL/SLUDGE/SEDIMENT SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet CS-8, line 5)		**$4,575**

Notes:

[a] Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to collect soil/sludge/sediment samples.

[c] Enter the estimated number of work hours required to collect one soil/sludge/sediment sample. If, for example, it is estimated that it will take 10 minutes per sample to collect soil/sludge/sediment samples, enter a work rate of 0.167 (10 divided by 60) for collecting the samples. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. If an estimate of the total number of hours required to collect soil/sludge/sediment samples has already been formulated, you may bypass this step and enter that number directly on line 1.E.

Depending on the activities being conducted, it may not be necessary to complete all sections of this worksheet.

1	**TRANSPORTATION OF WASTE IN DRUMS**		
1.A	Number of drums of waste	910 drums	
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)	12 truckloads	
1.D	**Cost to Transport Waste In Drums (Multiply line 1.B by line 1.C)**		**$13,050**
2	**TRANSPORTATION OF BULK LIQUIDS**		
2.A	Gallons of liquid waste	gal	
2.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
2.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	truckloads	
2.D	**Cost to Transport Bulk Liquid Waste (Multiply line 2.B by line 2.C)**		**$**
3	**TRANSPORTATION OF BULK WASTE**		
3.A	Number of waste debris boxes	debris boxes	
3.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste	$ /truckload	
3.C	**Cost to Transport Bulk Solid Waste (assume one debris box can be hauled on each truck) (Multiply line 3.A by line 3.B)**		**$**
	TOTAL COST TO TRANSPORT WASTE (Add lines 1.D, 2.D, and 3.C) (Enter total on Worksheet CS-1, line 7)		**$13,050**

Facility Name: CSA 50,000 Gallons

SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost **($)**
1.	Treatment and Disposal of Waste	CS-10A	
2.	Transportation and Disposal of Decontamination Fluids	CS-10B	$31,920
TOTAL COST OF TREATMENT AND DISPOSAL *(Add lines 1 and 2)* ***(Enter total on Worksheet CS-1, line 8)***			**$31,920**

If the amount of decontamination fluids generated during closure exceeds a volume that can be handled effectively by placing the waste in drums, such fluids may be handled and disposed of as a bulk liquid. This worksheet may be used to determine the cost to transport and dispose of wastewater generated during closure as a bulk hazardous liquid.

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheets to determine the total volume of liquid to be transported and disposed of. _____ gal _____ gal _____ gal _____ gal _____ gal	29,255 total gal	
2	Level of PPE assumed for this activity (protection level D, C, or B)[a]	D	
3	Labor and equipment cost per work hour[b]	$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon)[c]	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 3) (One hour minimum; round up to the half-hour)	2 work hours	
6	Subtotal of labor and equipment cost to pump decontamination fluid to a holding tank (multiply line 3 by line 5)		$107
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	1 days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per tank per day)	$ /day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	3 tanks	
10	Subtotal of tank rental costs (Multiply lines 7, 8, and 9)		$1,095
11	Removal cost per gallon of bulk liquid[d]	$ /gal	
12	Subtotal of removal cost for bulk liquids (Multiply line 1 by line 11)		$30,718
TOTAL COST TO TRANSPORT AND DISPOSE OF DECONTAMINATION FLUID AS A BULK LIQUID (Add lines 6, 10, and 12) (Enter total on Worksheet CS-10, line 2)			**$31,920**

Notes:

[a] Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.

[b] Enter the estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.

[c] Enter the number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, enter a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60) for conducting the activity. If an estimate of the total number of hours required to pump decontamination fluid to a holding tank has already been formulated, you may bypass this step and enter that number directly on line 5.

[d] Enter the estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

CONTAINER STORAGE AREAS CS-11

CERTIFICATION OF CLOSURE - Page 1 of 1

1	Number of units requiring certification of closure[a]	1	
2	Cost of certification of closure per unit[b]	$	
TOTAL COST OF CERTIFICATION OF CLOSURE (Multiply line 1 by line 2) (Enter total on Worksheet CS-1, line 11)			**$3,640**

Notes:

[a] Facilities closing multiple container storage areas in the same manner at the same time should incur cost of certification of closure only once.

[b] This cost includes the cost of performance of the following activities by a registered professional engineer: 1) reviewing the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.